The Boston Medical and Surgical Journal

Table of Contents

June 22, 1916

Massachusetts Medical Society.

THE ANNUAL DISCOURSE.

NOTE.—At an adjourned meeting of The Massachusetts Medical Society held Oct. 3, 1860, it was

Resolved, "That The Massachusetts Medical Society hereby declares that it does not consider itself as having endorsed or censured the opinions in former published Annual Discourses, nor will it hold itself responsible for any opinions or sentiments advanced in any future similar discourses."

Resolved, "That the Committee on Publications be directed to print a statement to that effect at the commencement of each Annual Discourse which may hereafter be published."

MOVEMENTS IN MEDICINE.*

BY DAVID L. EDSALL, M.D., BOSTON.

THE past two or three decades have been more important in certain ways to the medical profession than has any other similar period. There have been times when more deeply fundamental work was done in medical science than any which has come forth in this period, but there has been no time when there has been built, upon foundations already laid, a structure of such large importance and such sound value to the general public. Developing upon principles established before this time, and elaborated from them, there have been contributed a most remarkable number of facts, in many instances of very great individual importance. But, large as their individual value has been, it has been less significant than their influence as a whole, for this has been such as to alter the relations of the profession to the public at large in a way that is extremely noteworthy. I mean, obviously, first of all that the developments have been of such character that they have demonstrated as never before was done to all open lay minds, and have emphasized in the medical mind the economic importance of the public health. But, I mean beyond this that these developments have made medicine a much more complex profession, and have added a new and very important character to the calling. It is not simply that the details of progress have made it necessary to acquire more varied and extensive scientific knowledge in order to practise medicine. It is also and even more largely because, far more than was ever true before, they have imposed upon physicians the need of looking upon their profession in its relation to many general economic and social problems of the community as a whole, quite as much as in its relations to the individual sick. These changes have already produced and will produce in increasing numbers, a breed of doctors known earlier only occasionally, and then usually developed by circumstance rather than by design. The times just past and those at hand are likely, in fact, to prove more significant in their influence upon the character of medicine as a calling than any previous time.

The doctor has always been somewhat cloistered from the world of affairs. Untrained in executive and business matters and traditionally unsuccessful in these as a rule, he has been separated by his unsuitable training and by the urgent character of his work from any active part in public affairs. Indeed, he has been excused by law from some public duties

* Delivered before The Massachusetts Medical Society, June 7, 1916.

that other men are obliged to do, and by common tradition has been free of criticism if he took less part in other such matters than do most men. Medicine has, in fact, attracted very largely men who temperamentally shun public activities. Besides this, one of the more or less definitely recognized large compensations in medicine, and one that has been most jealously guarded and perpetuated, is that the doctor owes obedience only to the law and to his own conscience, and is not subject to human masters. As a consequence, he has often avoided and even resented, anything that interfered with his freedom of action, and this, together with the fact that there were few positions of dignity open to medical men in which they were parts of a system or were subordinate to higher authority, has made the general idea of being part of a machine moving in necessary coordination with other parts, usually distasteful. Indeed, even a position on salary has been a thing that often suggested that the man holding it was, perhaps, a failure in his chosen career except in a few types of work.

But the developments of recent decades have shown beyond peradventure that the broadest and most beneficent activities of medical men in preventing and eradicating disease have in later times been, and will mostly continue to be, not brilliant individual researches or individual struggles with disease, but organized systems of attack in which everyone, whether in senior or junior positions, will be no longer a free lance, but subordinate to the system, and dependent upon it for his success. In fact, in those activities that now give it its greatest public influence and power for good, medicine is not now an independent profession, but a part of a whole and dependent in accomplishing its aims upon firm executive control, whether this is exercised by a medical man or other. A very large proportion of the men who have won high distinction recently have won it because they have developed both their scientific capacities and their executive powers, and have employed organized rather than individual effort to accomplish their ends. This will be true to a still larger extent in the future, and the attractions of such a career will lead many of the ablest and most powerful minds into such work instead of into practice, and may readily attract into medicine many whose temperaments would earlier have led them into other forms of work.

What I have spoken of applies chiefly to the direct attack upon disease itself. But the character of the medical calling is being everywhere more or less profoundly influenced in another way. There have been among various peoples, especially among those highly cultivated for their periods, times in which very great interest was taken and valuable measures were adopted regarding the general social conditions that are largely responsible for the occurrence of distress and disease in the first instance and that propagate and perpetuate them. These measures were largely confined to individual races or nations, however, and also with changes in the fortunes of the people who originated or developed them, they in large part ceased to be effective, and they had at most an indecisive influence upon the medical profession at large. But we have been, and still are, witnessing a remarkable wave of public interest of world-wide extent in the social causes of distress and disease,—a wave that may well become a steady current, and that has carried away in some of the most important parts of the world certain established medical relations, customs and traditions. What I spoke of earlier you may well say is having an extremely interesting and highly important influence upon medicine as a whole, and upon a limited number of men in the profession who engage in research or enter into national, state, or municipal health services, or who are in other ways in a somewhat separate sphere, but has no immediate and acute bearing upon the life of the vast bulk of the profession who are engaged in practice. What I would refer to now, however, has the most intimate possible bearing upon the relation of most individual physicians to their patients. In dealing with disease it was customary for many years to adopt an attitude almost solely of defense. Even when hygiene became widely established, it had as its main object the control of existing disease, and, chiefly, epidemic disease. It took up the prevention of disease in limited degree only, owing to limited knowledge. In recent times knowledge of the immediate causes of disease, especially of infectious disease, has been so largely added to, that we recognize clearly that the whole matter has assumed an aggressive instead of a defensive aspect, and the great object now is the progressive destruction of diseases through eradication of their causes. A massive and organized attack upon the immediate causes that are most accessible—bacteria and the like—has been well begun. We have long realized that these immediate causes are only part of the story, and that the attack upon them must have but limited success so long as conditions favorable to their activity exist widely. Physicians more than others have appreciated that the manner and conditions of life largely determine the occurrence of disease, and they have been active in philanthropic and other movements that aim at the betterment of these conditions; but none realize better than they the difficulties of improving these conditions in any general and permanent way, and the slight and often transitory character of the results of local and especially of unorganized efforts.

The most brilliant and broad-visioned attack upon this problem—upon the social conditions that start and continue disease—that has come from medical men is one that originated here in the mind of Richard Cabot. I mean, of course,

medical social service. The rapidity and force of its progress over the country within a few years show not only its value, but also that the need has been so great that a workable system of attacking the problem was grasped at at once. But no one sees more clearly than the originator of this excellent plan that it is only partly preventive and chiefly curative. It is a pruning away of growths that have become harmful or are likely to be so, but so long as the roots flourish the outgrowths will occur and recur and frequently increase. A few years ago it sounded almost original to say that inefficiency, improvidence, distress and vice are the greatest of the causes of disease. Now it seems very familiar, but it has seemed a somewhat Utopian dream to consider that there would be anything but gradual improvement in these factors as the world rolled on. Throughout the last thirty years, however, many people have been wondering whether a promising method of influencing these factors rapidly had not been devised, and as experience of results accumulated, the opinion of many persons engaged in medical and social work and in statecraft has been turning more hopefully towards this system.

When Bismarck and William I introduced the bill which carried in it the beginnings of compulsory sickness, invalidism and accident insurance, it was presented as a means of relieving and forestalling distress, but it was recognized to be a means of preventing both the distress that produces disease and the disease that produces distress. It is a very remarkable fact that the beneficent purpose was so clearly put forth that the bill passed without opposition, radical and new as its provisions were. It is similarly remarkable that the principles underlying the action, its bearing upon the control of disease, and its vital importance to the medical profession, not only in relation to the livelihood of the doctor, but in relation to his powers of accomplishing results, have been so little appreciated by the profession in general. Even now that the system has been adopted in extensive form in Great Britain and, at least, suggestions of it in many of the countries of Europe, and it is here at our very doors for discussion, it has had very little attention from medical men in this country, and in so far as it has been discussed it has been in considerable part in a suspicious and defensive spirit. That some antagonism has been shown is not surprising, since medical knowledge of this system has in this country come chiefly through knowledge of the contests that it has excited from medical men in Germany and England. But it is the most important question of legislation bearing upon medical men that has ever come up in its relations to their incomes, in relation to their freedom of action, and in relation to the good that they may do in their work, and as such it must be approached with an intelligent knowledge, and demands study from medical men. Furthermore, it seems highly probable that whatever medical men may or may not wish, it will soon come in this country.

In Germany it has meant that, even previous to 1911, over 14,000,000 of the 64,500,000 of the inhabitants were participants in the sickness insurance and over 15,000,000 in the invalid insurance, and the medical and surgical care of the insured was provided for by the system and not by them as individuals. The new law has increased the participants by about fifty per cent. In regard to accidents, there were already about 24,000,000 participants. A similar proportion of the population is included in England in so far as the system has developed there, and a similar proportion would be included in the legislation proposed in this state and in New York during the past winter, and about to be proposed in other states. Manifestly, this is important to doctors. It is equally manifest that if doctors are not treated with scrupulous fairness such a wholesale control of their work and incomes is bound to do them injustice and perhaps great harm. It was chiefly because of lack of fairness in some instances, in others because, apparently, of a lack of understanding of the effect upon physicians, that contention arose with them abroad. This was partly due to the medical men themselves in that they did little in the matter until prospective or actual financial pressure led them to act. But it had the unfortunate effect of giving a wide-spread impression that medical men were bitterly opposing what, to a great proportion of thoughtful people, seemed profoundly benevolent legislation, on purely mercenary grounds; and when in any disagreement the question under contention is clearly one of emolument, it is very difficult to avoid the impression—whether it is a correct or a wrong one—that the basis of contention is not justice but self-interest. Bitterness at the thought of being under control, and sometimes under unfair control, has largely overshadowed the whole medical consideration of the matter; but it has come to the point with us where this system must be discussed, and, I believe, where it will before long be adopted; and I trust that, warned by previous experience, we shall be able to approach it always with the desire to secure justice for the profession, but equally with the desire to show that we wish justice for others, and with recognition of the fact that the system is capable of being carried out in such a way that it will not only preserve the rights of physicians but also, in some ways, may safeguard them, as compared with present methods, that depend upon the frailties and irresponsibilities of many individual patients.

The financial side of the matter unquestionably needs especial care in this country, not only in its relation to physicians, but in its general aspects, and particularly in justice to the insured, because our political morals are admittedly looser in this country than in Eng-

land or Germany. If adopted, the system means that astonishingly large sums of money will be handled by it, and the opportunities for and temptation to graft and the dangers of financial mismanagement will be very large. But granted that just provisions are made, we need to look upon the matter first of all as the largest social community problem that has appeared, and one in which medical men are peculiarly vitally interested because it so vitally influences their powers of accomplishment. I am quite convinced of the value and wisdom for people of narrow incomes of compulsory insurance, merely from the standpoint of automatically protecting them against times of stress through their own efforts with added aid from employers and the state. From the standpoint of the public health there can be little doubt of its powers for good. To be very brief, let me quote but two remarkable facts: first, that over 100,000,000 persons had been given benefits under the system previous to 1910; and, second, that even before the additional income was provided by the new law, about half a million dollars a day were being spent in Germany through this system, and that, with the numbers of people in this country and with the American scale of wages, this sum would at least be doubled here under similar conditions. These facts show the financial power in the system. In Germany this money has been in large part spent, not only in benefits and other necessary, though more or less temporary, but vastly important things. Much has, in a remarkably broad spirit, been devoted to constructing and maintaining hospitals and other institutions for sick and invalid persons, and to a great variety of other purposes; including, for example, the constructing of, or the lending of money at low interest for the building of, public baths, water and sewer systems, and similar hygienic advances; building houses of hygienic character to rent at moderate cost to working people,—in fact, for the money available above the benefits necessarily paid, all broad uses that would strongly tend to improve health and diminish sickness, have been sought out energetically as peculiarly sound investments because tending to decrease progressively the outlay of the insurance societies by decreasing the need of benefits. One can scarcely contemplate the use of such large sums of money without being convinced that if only reasonably wisely used, an enormous and relatively rapid influence in improving health must result, through eliminating many unhygienic conditions and still more through doing away with the acute distress that sickness and invalidism bring to those affected and to their dependents. So important a problem needs broad and friendly consideration. I believe it can be arranged with entirely dignified relations to the medical profession, and even with actual benefit to the profession. One of the most successful ways of avoiding disagreements is through not forcing regulations, but agreeing upon them; and the more largely arrangements with medical men are made through friendly understandings rather than as bargains, the more successful they will be. Indeed, I believe that it would greatly help in avoiding contention, and beyond this in establishing in wise form many of the details of the system in which medical advice is highly important, if the local medical men involved had direct representation on the governing bodies of these insurance societies if they come to be formed, just as both employees and employers must be so represented. This has not been done abroad, but it seems to me eminently just, since physicians are, of course, essential to the system, and they are quite as vitally affected by it as anyone. And it is not only just, but would accomplish more efficient results in a variety of ways. It appears to me, at any rate, that this body may well take means to carry out a study of the matter and to determine upon a plan of action, before the need of hastily determined action perhaps arrives precipitately. If it arrives, it will at one step turn a large part of medical practice into part of a great system, instead of a purely individual relation with individual patients.

Many other factors are tending to make medicine more important as a public profession, and relatively less so as a private relation in its main activities and emolument. The decrease in infectious disease that has already occurred has distinctly lessened the total demand for family doctors. Also the state has taken over a very definite share of the actual management of some cases of infectious disease, and will necessarily exercise a gradually increasing control. It will, I am sure, not be many years before an appreciable influence will be exercised upon venereal disease by public action, difficult though this question is and demanding, as it does, cautious and unimpulsive measures in order to avoid doing harm. In the world at large the alcohol question has shown remarkable progress, and to me the time seems clearly ripe in this matter, not for joining prohibition movements or other drastic types of action, but for a frankly aggressive stand on the part of those who see its effects, and especially those who have responsibility for the public health,—a stand that does not need to ally itself with the emotional side of the question, but should rather be definitely educational, and with improved health and efficiency as its objects. When we see what such methods have done for tuberculosis we can scarcely doubt they can do similar things in controlling the effects of alcohol and venereal disease, especially when the changed and increasingly positive attitude of employers and of the public at large toward alcohol, in particular, is considered. With a decided drift toward the control of these enormously important causes of disease, a large effect upon the

sum total of the doctor's individual repair work and upon his purely palliative treatment must be exerted.

I am not one of those who feel that the health millennium is at hand, nor do I comprehend within my vision the time when medical practice will be a matter in which the doctor and the patient—as they have long been known—will no longer exist, and the treatment of disease will be carried out through government bureaus and public institutions. Doctors and patients have too human a relation to make this possible, however efficient it may appear to some persons. But I do see increasing influence of the doctor as a public servant; and with this an increasingly large proportion of the strongest and most important men in medicine will go into other forms of work than ordinary practice, so that the attractions of the newer forms of activities, as well as the influential character of the problems that they deal with, will tend to make them a great power in determining the character of medicine as a calling, whereas, until recently, its character has been determined largely by the practice of the art of medicine. All these movements will lessen the total number of the sick, and probably the number of practising physicians, but need not lessen the influence of the latter in the community. On the contrary, they will tend to increase it, for when wisely taken advantage of, they give physicians, not only their very strong human influence with individuals, but also an influence as public councilors and leaders, that the calling did not until recently carry with it.

The changes in the character of a calling and in its ideals, aspirations and traditions usually come chiefly from two sources: from the pressure of the demands upon it and from the visions that those entering it see. That medicine has greatly changed, not merely in knowledge, but in the demands upon it, we know well. That it has changed in the visions that it carries with it must be very apparent to anyone who has frequent occasion to advise young men, of especially earnest and ambitious type, who are just entering the profession, in regard to what was, not very long ago, a relatively simple matter, namely, as to the character of work that they may wisely take up at once. Twenty-five years ago there were few things to choose from. Few men thought at once of anything but some form of practice—of caring for the sick. With most men then it was a choice of the particular form of practice that most attracted. In fact, in most instances, even specialization in some particular form of practice was a future prospect to be worked up to through early general practice, rather than an immediately necessary choice; and the advice was often flatly given that experience in general practice should precede specialization of any sort. Some men who were hard pressed financially, or who looked merely for a berth that was fairly secure, put aside practice, temporarily at any rate, and went into institutional work or into the government services, though a small number were keen enough to see real opportunities in the latter. There were at that time relatively so few positions in teaching, and especially in research, available, and particularly so few that could be had very early in one's career and that carried a living with them, that only an occasional man could go directly into such work. Indeed, until recently, even the full-time senior positions in laboratory branches have been in large part filled by men who had earlier been, to some degree, in practice; and had by choice, or sometimes by circumstance, later been led into this work as a career. It was, I think, at that time usually somewhat of a shock to a man who had gone through a medical course, even almost like a confession of failure to measure up to the career that he had planned, to see before him the definite separation of his activities from the care of patients. It was something like the conditions in Dr. Weir Mitchell's youth in regard to research. You may remember that when he told his father, after he got through his hospital work, that he would like to spend several years in research, his father somewhat hotly told him that that would be looked upon by the public very much the same as if he had joined a circus. At present things are vastly different. The great majority of young men, of course, still go into practice, but very often now they make an immediate choice of some particular line of practice. The most striking difference now, however, is that there is no longer a suggestion of shock in considering the choice of some form of work that does not involve private practice. It no longer means a distinct shifting of purpose and detachment of one's self from the real medical career. The great majority of the most alert and most ambitious young men are loath from the first to feel that their work will be limited to practice. Much more frequently than was the case they look forward to doing, at least, some research and teaching as collateral activities. A considerable proportion of them seriously consider whether they will not go definitely into other things than practice, and a noteworthy and constantly increasing number are doing so. There is no reason to think that the proportionate number in the latter group will decrease. On the contrary, there is every reason to think it will increase. This changed viewpoint has been brought about by several main factors. What I have been discussing has had much to do with it. An interestingly large number of young men of the best type are beginning to have yearnings toward direct public service in some form, partly because they frequently feel a conscientious desire, widely growing in many other professions, for such service, but partly because they see the possibilities of fruitful work in these lines. The national services already offer attractive careers. If the tenure of

office and the opportunities provided in state and municipal work were only more frequently adequate, many would go into these lines, and more men of good caliber are greatly needed in them. It is very interesting to see the change in attitude. Such positions now appeal to young men directly as opportunities. We have only slowly realized that they are not chiefly sleeping berths.

The main factor, however, that has changed the viewpoint of young men has been the change in the character of the teaching of medicine, and the increasing complexity of the study and practice of medicine. Important as it has been, the change in the public relations of medicine, the long quick stride ahead in its economic and social relations and dignity, has been of secondary importance. Without the former, these men would not have seen or been prepared for the latter. The placing of the laboratory branches of medical study in this country in their proper positions of dignity and influence has, without doubt, had more effect than anything else in developing both the standards and the visions of the young men in medicine. This movement was begun before the period of which I spoke, but reached a general and satisfactory development only during that period. When these branches were looked upon by the men teaching them as collateral interests, and very often merely as stepping-stones to practice or to clinical chairs, it was natural that they should have relatively little influence. With the recognition of the need of laboratory teaching of laboratory branches by men highly trained in them and devoting themselves to them, came not only the result mainly desired, namely, the opportunity for the prospective practitioner to get sounder fundamental training, but also the opportunity for those whose bent lay that way to learn early the charm for them that there is in hand-to-hand work in those subjects,—a charm that without this intimate contact with them was often never recognized, or was felt only through later chance. The work in course in the laboratory now leads a considerable group to think of life work in these branches; and the comparatively large and constantly increasing number of available senior and junior positions in teaching departments, in hospital laboratories and in other places, that carry a living with them, give opportunity for a noteworthy number of men to take up such work at once. But, besides this, the result of having a group of able and devoted men engaged, not simply in casually teaching fundamental branches, but in spending their whole time in energetically developing knowledge of them, has been that enduring contributions to knowledge have come very largely from men in these branches; and also, men so well trained as to be stimulating and inspiring to young men who are intellectually ambitious, have in such large proportion been developed in these subjects that it has led into them a large share of that group of young men, always small in number, but always of dominating importance in any profession, those, that is, who are gifted with the desire and the power to contribute to progress. In recent years, men capable of judging have repeatedly said that in the past generation there have been a larger number of men of first-rate mind in the laboratory subjects in this country than in the clinical. Whether or not this statement is correct we do not now need to determine. We may, nevertheless, well reflect upon the fact that conditions are such that it is difficult to disprove it. A point that interests me very much, however, and one that is, I believe, certainly true, is that a large proportion of the very best young men shrink now much more than they did in earlier years from going quickly into practice. Some of the reasons that they give are interesting and need attention. In considerable part it is because they feel that the standards of practice do not meet what they desire; that they are less exacting, less reliable than those of the medical sciences, and they often feel that it is very difficult to avoid taking a step downward in regard to thoroughness and accuracy of effort when they detach themselves from work in the medical sciences and take up practice. Some of them frankly confess that they fear that they must turn away from the standards that they have come to cherish, which demand that the intelligence must be satisfied before accepting anything, and that, instead, they must in practice flounder among impressions and speculations and unproved theories. Much of this is youthful exaggeration, and much of the shrinking from practice is due not to such feelings, but to a natural desire to become better fitted for work that the last few decades have made much more complex than it was. Much of it is due to the fact that indefinitely continued work on problems is more fascinating to many able minds than practice, and as I have already said, the present method of teaching medicine presents it and its problems much more intimately to the student, and makes these problems much more engaging than did the older method. Some of it, a good deal perhaps, is due to the fact that at present students come into contact with patients so much more closely than they did, but see them chiefly in hospital wards, where, like those who are in consulting practice, they meet so large a proportion of persons who, through disease or distress or vice, seem beyond help, that they occasionally become oppressed by it and by what practice seems to mean. They have had little opportunity to experience the cheerful things that practice brings, and have had but a small share of the grateful human side of medicine, that comes in its best and most frequent form in the relation between family physicians and their patients. I have known repeated instances of hospital internes becoming completely shattered emotionally by the strain and discouragement of a prolonged succession of

distressing and hopeless cases, and have known them repeatedly to resign impetuously, and even to quit the profession at once. Nevertheless, when all the factors mentioned are allowed for, it seems to me that the proportion of first-rate men whose feelings are more or less deeply colored with regret when they take up practice is worthy of study when we consider that the great *raison d'être* of the medical profession is still, and will long be, to treat the sick. It would seem to be evidence of some incompleteness in development of our present system, especially when we consider that almost all young men a few years ago looked happily forward to practice at first, and if they became detached from practice, did so only later. There are but few I am sure who believe that the cause of this lies in the greater development of the teaching of the medical sciences. Long before the medical sciences were given so much time and attention as they now are in the curriculum, there were critics, conspicuous among whom were John Brown and Oliver Wendell Holmes, who feared that these subjects were being overdone, to the disadvantage of the clinical. But it is very difficult to believe, so long as the clinical branches are given the large amount of time that they are now, that the better teaching of the fundaments of medicine is a fault. Paradoxical as it may seem, it would, on the contrary, appear that the line of advance that has perhaps produced this condition must, in a certain sense, be forced further to overcome it.

The trouble does not, I think, lie in the fact that practice involves working so much in things of which we are ignorant. Bolder and more inquiring minds enjoy the unknown. It is rather, I think, that there still exists a chasm between the laboratory and the clinical branches, with only occasional bridges between, and these not very secure. The persistence of this chasm is due partly to imperfect efforts on each side toward its effacement. The divorce of the laboratory men from practice and their alliance in manner of life with pure science, led many of their number for a time, as occurs so often after any important readjustment of principles of life, to a somewhat deliberate and ascetic detachment from the practical. This reached its most marked stage when a group of them advocated that these branches be taught outside the medical school as a part of general university courses, so as to remove any taint of utilitarianism from them, a plan based in part at least upon what may, I think, without injustice, be called a kind of intellectual snobbishness that considers the practical use of science much the same as its prostitution. In recent years there has been a strong opposite current, and co-operation between the laboratory and clinical departments has become the recognized goal. But there is still opportunity to make teaching in the medical sciences more directly illuminative of clinical study, though not simply utilitarian. The chief cause of the sharp division between the clinical and the laboratory years, however, is, I believe, that observation and speculation are much more dominant methods in the activities of the clinician in both his teaching and his practice, than they need to be. Habits are strong factors, and clearly as we may recognize the relations of the medical sciences to practice, it is extremely easy to fall into the methods that we were taught, and these were chiefly observation and speculation, and I fear that those of us who are clinical teachers and practitioners must bear the chief blame if the keen student feels critical of clinical methods. Furthermore, few clinicians have sufficiently intimate and prolonged training in any of the medical sciences to be able to teach their relations to medicine in any adequate way, and yet they must do it if it is done, for the laboratory men have, as a rule, little or no clinical knowledge nowadays.

This is one of the reasons why, after some consideration, I not only do not feel opposed to the much-discussed plan of having a group of clinical teachers, who practise little or not at all outside hospitals, but, on the contrary, feel it will do good. What I have mentioned regarding the not uncommon attitude of the student and recent graduate, as well as experience of other kinds, lead me to feel that one of the things we most need in training young men is to stop the gap between the laboratory and the clinical years. I think this can best be done by having a group of clinicians so long and continuously engaged in the investigation and study and teaching of clinical problems that they naturally and efficiently bring into play all the relations between the fundamental and the clinical branches. This would undeniably be valuable to the student in his formative years. It would dispel any feeling that practice must be a disappointment to those of scientific temperament, and it would add what the laboratory departments have had to their advantage,—a group of men devoting themselves so completely to the study and development of their branches that they would attract many keen and inquiring minds into clinical work that have tended to go into the laboratory subjects. This again is one of those things that is probably coming in varying extent in various places; that has, in fact, already come in considerable degree, not in one place alone, but in a noteworthy number in a very few years. And, a point that has greatly influenced my feeling as to its probable spread, one finds again, that, in clinical medicine at any rate, a large proportion of the ablest young men not only do not resent the idea, as some older men have, but welcome it heartily. It will, of course, not displace the customary type of clinical teacher. It will simply, like some of the other things I have mentioned, add a new breed that will have its own peculiar function,—a function developed from the progress that medicine has made.

Original Articles.

RESPIRATORY EXCHANGE, WITH A DESCRIPTION OF A RESPIRATION APPARATUS FOR CLINICAL USE.*

BY FRANCIS G. BENEDICT, BOSTON,
AND
EDNA H. TOMPKINS, BOSTON.

(Continued from page 864.)

PART II.

A CLINICAL RESPIRATION APPARATUS AND ITS USE.

THE clinical respiration apparatus represents the culmination of the research which has been in progress for several years in this laboratory on the development of a suitable apparatus for use with pathological cases. The dog respiration chamber, the infant respiration chamber, and the chamber for small animals, all of which have been previously described[2], were steps in the development of the larger apparatus.

In devising this apparatus a number of important points had to be taken into consideration from the beginning. In the first place it was necessary to reduce the volume of the chamber to the smallest possible limits consistent with the physical and psychical comfort of the patient. Secondly, since complicated and technical difficult gas analyses are precluded in an apparatus intended for clinical purposes, a method had to be devised which should make these unnecessary. Of fundamental importance also, were a rapid and satisfactory temperature control, a graphic record of the degree of muscular activity or repose of the individual, and psychrometric determinations of the moisture present in the chamber. Finally it was necessary that the apparatus should be so adjustable as to make it likewise available for studying the respiratory exchange according to the Jaquet-Hasselbalch principle, by eliminating the gas meter and simply analyzing the outcoming air.

The clinical respiration apparatus in its finished form consists of: (1) a respiration chamber, suitably illuminated and ventilated, in which the subject may lie comfortably upon a cot; (2) a universal respiration apparatus with a rotary blower for ventilating the chamber, an absorbing system for purifying the air of carbon dioxide and water, and a suitable oxygen supply; (3) accessory apparatus in the form of thermometers, a barometer, and apparatus for recording the pulse-rate and the degree of muscular repose.

In this description of the clinical respiration apparatus, it is advantageous to consider first the universal respiration apparatus.

* From the Nutrition Laboratory of the Carnegie Institution of Washington, Boston, Mass.

THE UNIVERSAL RESPIRATION APPARATUS.

The universal respiration apparatus, which was developed in the Nutrition Laboratory and has been used in a considerable number of researches, has already been described in detail elsewhere.[3] Since that description appeared several modifications have been made in the apparatus, with particular reference to its adaptation to experiments in which a chamber is used, and hence a further description is desirable here. In principle the respiration apparatus is designed to supply the chamber with a moving volume of air, absorb the carbon dioxide in the outcoming air, replace the oxygen consumed by the subject, and return the air again to the chamber with a chemical composition not materially unlike that of atmospheric air.

In the process of purification the carbon dioxide in the air is completely absorbed, the amount excreted by the subject being determined by the increase in weight of the absorbing vessels. Thus gas analyses, with their attendant difficulties of technic, are unnecessary. The oxygen consumption is quantitatively determined directly by noting the amount it is necessary to introduce into the respiration chamber in order to secure the same volume of air in the chamber at the beginning and end of the experiment, due allowance being made for changes in temperature, pressure, and volume of water-vapor. A schematic outline of the respiration apparatus and chamber is shown in Fig. 1 (See page 906).

The air, as it leaves the chamber through the pipe X, contains the carbon dioxide and water given off by the subject and is also deficient in oxygen, owing to the oxygen required for combustion in the subject's body. The outcoming air is forced by the positive rotary blower R into the absorbing system and passes first into the empty glass Williams bottle A, which serves as a trap to prevent any back suction of acid in case of an accident. The air then passes into the large Williams bottle B, containing concentrated sulphuric acid, and from there into a smaller Williams bottle C, also filled with acid, which acts as a control. The water-vapor is thus completely removed, but the carbon dioxide still remains. On reaching the valve V_1, the air passes into either one of two sets of purifying systems, consisting of soda-lime and sulphuric-acid bottles. The carbon dioxide is completely absorbed by the soda lime in D_1 or D_2 and the water given off by the moist soda lime is also removed by the sulphuric acid in the second vessel E_1 or E_2. In certain instances it is desirable, particularly in long experiments, to insert two soda-lime bottles, and hence Fig. 1 shows sections of the tube, L_1 and L_2, which can be removed and replaced by a soda-lime bottle.

After the air leaves the carbon dioxide absorbing system through the valve V_2, it passes through a can F containing sodium bicarbonate to remove the small unweighable traces of acid

vapor, which might otherwise irritate the nose and throat of the subject, and then continues into the respiration chamber shown in the lower part of the figure by way of the pipe Y. Y. Y.

Theoretically, oxygen may be admitted at almost any point in the air-circuit, but here it is represented as being introduced from a large cylinder O through a meter G at a point in the pipe a, a, connecting the spirometer or tension-equalizer S with the chamber. Variations in the volume of the air in the chamber are corrected by means of the spirometer S. In describing the various parts of the universal respiration apparatus more in detail, it seems desirable to follow the course of the ventilating current.

BLOWER.

After experimenting with many different types of blowers, we have found the most satisfactory to be that supplied by the Crowell Manufacturing Company of Brooklyn, N. Y., under the specification No. O-D Rotary Compressor. This can be secured from the manufacturers in a surrounding iron box which is suitable for an oil immersion bath. It is a positive blower in that the air withdrawn from the chamber may be forced through a considerable number of layers of sulphuric acid and soda lime contained in suitable vessels. The rotary blower (see R in Fig. 1) is connected by a leather belt to a small electric motor and can be provided with a safety clutch to prevent the reversing of the wheel through carelessness and the drawing over of sulphuric acid from the water-absorbers. This latter feature has been found of advantage, although the safety trap A has usually prevented the drawing over of the acid into the blower. The speed of the blower may easily be altered by a simple lamp resistance, these blowers usually giving a suitable ventilation—not far from 35 liters per minute—when rotating at the speed of 270 revolutions per minute.

ACID TRAP.

To prevent the possibility of drawing back strong sulphuric acid into the delicate mechanism of the blower, an empty glass bottle A is inserted in the system. While almost any form of bottle can be used for this purpose, it has been convenient for us to employ an empty reversed Williams bottle.

WATER ABSORBERS.

The air leaving the respiration chamber contains a large amount of water-vapor from the lungs and skin of the subject. Before the carbon dioxide produced by the patient is absorbed, it is important to remove this water-vapor entirely from the air. The current is therefore first passed through two or more bottles containing sulphuric acid. Usually one large-sized Williams bottle, B, is sufficient to collect nearly all of the moisture, but this is followed by a second bottle, C, which retains the last traces of water-vapor.* To facilitate handling and to prevent breakage, each bottle is usually inclosed in a small wire basket with a handle, by means of which it may be suspended directly from a hook on the arm of the balance. When these two Williams bottles are used, it is possible to retain the first one in the circuit until the acid and water have so increased in volume as to render them liable to be carried over mechanically into the second bottle. As much as 100 or 200 grams of water-vapor may be absorbed before a change is required; it is fundamentally important, however, to note that this second Williams bottle, as well as the water absorber following the carbon dioxide absorber, must not increase in weight more than 10 grams before being renewed, and should be controlled by frequent weighing.

TUBING AND PIPING.

The Williams bottles, as well as the soda-lime bottles for absorbing the carbon dioxide are fitted with short lengths of rubber tubing of good quality, to which are attached respectively male and female parts of ordinary garden hose couplings of the standard ¾-inch size (approximately 16 mm. internal diameter). The couplings are, therefore, interchangeable with different forms of apparatus. With a standard rubber hose gasket, the couplings can be made airtight by a simple twist of the hand. All of the piping throughout the apparatus is of standard ½-inch (16 mm. internal diameter) pipe.

TWO-WAY VALVE.

In order to deflect the main air-current from one set of purifiers to the other, it is necessary to have a two-way valve. The valves V_1 and V_2 are of this type.† A long steel rod connects the two valves in such a way that by throwing the handle at one valve, both are simultaneously turned and the air-current instantly deflected from one set of purifiers to the other.

CARBON DIOXIDE ABSORBING SYSTEM.

The most effective absorbent for carbon dioxide that we have found is slightly moist soda lime.‡ The soda lime containers D_1 and D_2 are wide-mouthed glass bottles. Each bottle contains 2 kilograms of soda lime, capable of absorbing not less than 75 grams of carbon dioxide, and weighs, when filled, about 4 kilograms. The dry air in passing through the moist soda lime absorbs moisture, and it must, therefore, be dried again, which is done by passing it through the Williams bottle E_1 or E_2.

* The Williams bottles are made for us in Berlin by the Vereinigte Fabriken für Laboratoriumsbedarf.

† These are of standard design made by the Lunkenheimer Mfg. Co., Cincinnati, Ohio.

‡ At present, upon the recommendation of Dr. Eugene F. DuBois of Bellevue Hospital, we are obtaining an excellent grade of soda lime in large amounts from Stanley Jordan & Co., 116 Broad Street, New York, N. Y.

Either series of carbon-dioxide absorbers may be used as desired, for if the air-current has been passing through the series D_1 and E_1 for a given experimental period, the air can be instantly deflected through the series D_2 and E_2 by turning simultaneously valves V_1 and V_2. The combined increases in weight of the absorbers D_2 and E_1 or D_1 and E_2 represent the amount of carbon dioxide absorbed. It is possible that the amount of water-vapor given up by D_1 to the dry air passing through it may be actually more than the amount of carbon dioxide absorbed, so that the bottle D_1 may lose in weight. On the other hand, the water-vapor given up is immediately absorbed by E_1 and hence the algebraic sum of the weight of the two bottles gives the weight of the carbon dioxide absorbed. Usually both bottles are weighed on a balance at the same time.

The moisture in the soda lime is essential to the efficiency of the absorbent. The amount of water absorbed by the air-current from the soda lime and collected in the Williams bottle E_1 or E_2 may be determined by weighing the Williams bottle separately. If the soda lime is remoistened with the same amount of water that has been lost, the absorbent may be considerably regenerated. It has been found practicable to add the water through a funnel inserted in the intake of the soda-lime bottle at the end of each day's experimentation. By the next morning the experiment can be carried on as usual.

Although moist soda lime is a most efficient absorber of carbon dioxide, yet it has been thought desirable to test the completeness of absorption by the insertion of a small flask H, containing a solution of barium hydroxide, in such a manner that, by opening the pet-cock P_1 and P_2, a portion of the air from which the carbon dioxide has presumably been absorbed may be deflected through the barium hydroxide solution, where the slightest trace of carbon dioxide is indicated by a turbidity.

As the amount of carbon dioxide given off by the subject is determined by noting the increase in weight of the soda-lime vessels D_1 or D_2 with its attendant Williams bottle E_1 or E_2, the degree of absolute moisture in the air when it enters the soda-lime bottle and leaves the Williams bottle should be identical. If, however, the sulphuric acid in the Williams bottle E_1 or E_2, which follows the soda-lime container, is allowed to accumulate water to such an extent that its efficiency as a water-absorber is somewhat less than that of the Williams bottle C, preceding the soda-lime container, it is obvious that there would be a loss of water from the system as a whole and the amount of carbon-dioxide thus measured would actually be too small by the amount of water escaping absorption. Conversely, if the air is not so dry before it enters the soda-lime bottle as when it leaves the Williams bottle following, there will be an undue increase in the weight of the carbon-dioxide absorbing system owing to the excess water absorbed. If the routine with the Williams and the soda-lime bottles is carried out as previously outlined, no difficulty is experienced, but it is advantageous occasionally to test the efficiency of the apparatus for absorbing carbon dioxide and water-vapor. Consequently in blank tests, *i.e.* with the apparatus in operation but with no subject inside, it is advisable to weigh the sulphuric-acid and soda-lime vessels separately, and continue passing the air through the system for a half hour. Under these conditions, the loss in weight of the soda-lime vessel should of course be exactly counterbalanced by the increase in weight of the accompanying Williams bottle.

SODIUM-BICARBONATE CAN.

In order to absorb the unweighable traces of acid fumes which may remain in the air after it has been carried through the Williams bottles, it is necessary to insert in the air-circuit a small can F, filled with dry sodium bicarbonate and cotton batting. This completely removes the acid fumes and does not affect the determination of the carbon dioxide or of the oxygen in any way. The sodium bicarbonate does not need frequent renewal, the amount used remaining efficient for approximately a year's experimenting.

OXYGEN SUPPLY.

The point at which the oxygen is introduced may, of course, be varied according to the conditions under which the apparatus is to be used. The direct determination of the amount of oxygen absorbed by the subject may be made either by introducing it from a small cylinder of the gas and noting the loss in weight during the experiment, or by passing the oxygen through an exceedingly delicate and accurate gas meter, as is represented in Fig. 1. Small cylinders of compressed oxygen, which can be readily weighed, may be secured from the Linde Air Products Company of Buffalo, N. Y. These cylinders weigh, when filled, about 3 kilograms, and contain about 150 grams of oxygen with a purity of about 98%.

One of the greatest difficulties in using these cylinders has been the selection of a suitable valve, that furnished on the cylinder by the manufacturer being difficult to utilize, owing to the high pressure under which these cylinders are filled. Formerly recourse was had to one of the numerous types of reduction valves, but a thorough test of these showed no valve which would functionate properly for a long period. One or two types of needle valves have been found which are much less expensive and give a satisfactory closure. Such a needle valve is coupled to the exit of the cylinder, then closed, and the main valve on the cylinder is opened to its fullest extent. The issuing gas may then be very delicately regulated by means of the needle

valve. With so high a pressure it is obvious that the packing around the main valve stem should be excellent so as to give no opportunity for leakage of air. The valves may be tested by immersing the cylinder and valve in water or by weighing the cylinder carefully on a balance, and then again an hour later; any loss of oxygen between the two weighings will be instantly apparent.

Extended experience in respiration experiments has shown that the respiratory exchange is absolutely unaffected by increased oxygen percentages and even by the respiration of pure oxygen, but if the oxygen percentage is lowered to 11 or 12%, respiratory disturbances are apt to appear. In actual practice, the oxygen in this chamber and in the chamber of the respiration calorimeters in this laboratory remains from 20 to 23%.

GAS METER.

From many standpoints, the use of a small weighable cylinder of oxygen is to be recommended. On the other hand, there are certain advantages in favor of using an accurately calibrated gas meter under such conditions as to preclude excessive temperature fluctuations. In our experiments we have almost always employed a large cylinder of oxygen with a needle valve, conducting the gas through a carefully calibrated meter of the type devised by Bohr and manufactured by the Dansk Maalerfabrik of Copenhagen. This meter registers 5 liters for each complete revolution of the drum and may be read directly to 50 c.c. Being constructed of britannia, it may, without injury, be completely immersed in water in a large aquarium vessel and so leveled as to be easily read. The corrections for temperature changes are minimized by this immersion in water. It is not possible, of course, to control the barometric fluctuations, and the meter readings should, therefore, be corrected not only for the average of the temperature fluctuations obtaining throughout the experimental period, but also for the average changes in the barometer. For relatively short periods, this can best be done by using the temperature readings taken at the beginning and end of the period, and the barometer readings taken at the same time.

The meter is calibrated by the method of weighing[4] the gas delivered from an oxygen cylinder. Many tests of this type of meter show that, when properly installed, it gives admirable results, and when a long series of experiments is contemplated, its use is strongly recommended. A small, weighable cylinder of oxygen is required in either method, since such a cylinder is necessary for the calibration of the gas meter.

The oxygen leaving the cylinder first passes through the small bottle of water, which is immersed in the tank containing the gas meter. This serves to saturate the oxygen with water, for in its compressed state it is extremely dry. The safety tube in the bottle, as used by Mr. L. E. Emmes of the laboratory staff, has proved most satisfactory, for any sudden inrush of gas is checked by escape through this pipe. After saturation with water the oxygen passes through the gas-meter; as soon as the gas has reached the temperature of the bath, water is neither deposited nor taken from the bath, and the water level remains indefinitely unaltered.

SPIROMETER OR TENSION-EQUALIZER.

Although an absolute temperature control is theoretically possible with this apparatus, thus securing a constancy in the apparent volume of the air in the closed system, it is practically impossible to prevent slight temperature fluctuations, and these, together with the unavoidable and uncontrollable fluctuations in the barometric pressure, indicate the necessity for some form of tension-equalizer which will insure atmospheric pressure in the chamber. For this purpose a small spirometer S is used. When a mouthpiece or nosepieces are employed with the universal respiration apparatus instead of the chamber, the entire air-current passes through the spirometer, and sundry devices are attached to it for tracing graphically the volume of each respiration and for indicating the total ventilation of the lungs. When the respiration chamber is used, however, it is not necessary for the air-current to pass through the spirometer; consequently, the three-way valve V_3 is closed to the spirometer and direct connection is made between the spirometer and the respiration chamber by means of the pipe a, a, a.

The construction of the spirometer is shown only in schematic outline in Fig. 1, and for the details reference must be made to other publications.[5] As commonly used on the universal respiration apparatus, the spirometer has a content of about 2½ liters. During the development of the clinical chamber a considerably larger spirometer was employed which held approximately 5½ liters, but more recent testing of the apparatus has shown that the standard size is amply sufficient for the purpose. With a small spirometer there is always a possibility that a patient may suddenly make a violent or extended muscular movement inside the chamber, such as in turning over, throwing off the bed clothes, or unduly moving the arms or legs, which would produce an expansion of air that would lift the bell of the spirometer above its normal limits and out of the water, thus causing a leakage of air. The danger of such an accident may, of course, be avoided by the use of a larger spirometer, but it is rarely that even a large subject would make such extraneous muscular movements as would produce this effect. Two practical methods may be employed for preventing it, even with a small spirometer. One is to place a weight of 80 grams on the bell of the spirometer when it is rapidly rising, thus immediately lowering it; the weights can be re-

moved when the conditions inside the chamber have again become normal. Another expedient is to place a bar across the top of the spirometer guide supports in such a manner as to prevent the bell from rising high enough for air to escape. With the use of such devices when necessary, we feel confident that a spirometer with the ordinary volume of 2½ liters is sufficient for use with the clinical chamber. Furthermore, experimental periods in which the muscular activity was sufficient to expand the air unduly would be of little, if any, value. With the use of the small spirometer, however, the operator should take care that no air is lost through an undue elevation of the spirometer bell or the admission of an unnecessarily large amount of oxygen.

The exact height of the bell should be recorded at the beginning and end of each experimental period by noting the position of a pointer attached to the counterpoise and travelling over a vertical millimeter scale. The spirometer bell is delicately counterpoised so as to give zero pressure at approximately a middle point of the scale. There is no particular compensation device used in connection with this spirometer to allow for the variations of the metal displaced as the bell enters or leaves the water; consequently there are, theoretically at least, slight alterations in the tension with the different positions, so that it is advantageous to have the bell in nearly the same position at the beginning and end of each experimental period. The oxygen supply is then shut off and the bell gradually sinks. It is highly desirable that at the end of each period the bell should always be sinking, and thus in part compensate for the slight alteration in tension. More recently we have found it advantageous to move the counterpoise rod up or down by hand at the exact end of the period, until the very delicate petroleum manometer T indicates that there is no pressure. At this point the reading is taken.

MANOMETER.

The small oxygen consumption and the large volume of the respiration chamber with its accessory parts make the influence of slight changes in temperature and pressure of great moment in measuring the total oxygen consumption. Consequently it is essential to note the exact pressure inside the chamber. This is assumed to be atmospheric, but it is possible that the spirometer does not respond instantly to slight changes in pressure; accordingly it is more efficacious to use a very delicate manometer. This manometer T is of the type employed by Pettersson and Sondén in their gas-analysis apparatus and indicates the slightest alteration in atmospheric pressure. It consists of a glass tube bent in the form of an arc and containing a drop of petroleum oil.

BALANCES.

The carbon dioxide elimination is determined with this apparatus not by means of gas analyses, as is customary, but by accurately weighing the soda-lime bottle and its accompanying Williams bottle. These two absorbers have a combined weight of not far from 5 kilograms, and since approximately 10 to 15 grams of carbon dioxide may be produced in a half-hour period, it is necessary to weigh these two vessels to within 0.05 gram. This is done admirably by means of a balance that has been in use in this laboratory for a number of years and which, though relatively inexpensive, has a high degree of accuracy.* The balance, covered with a glass case to protect it from drafts of air, is placed in a suitable location in the laboratory and used for weighing both the soda-lime bottles and Williams bottles, also the small oxygen cylinders required when calibrating the gas meters.

BAROMETER.

One of the most important factors in the accurate measurement of the oxygen consumption is a knowledge of the temperature and of the barometric conditions obtaining inside the large respiration chamber at the end of the experimental period. The measurement of the barometric pressure gave us entirely unlooked for difficulties. From a consideration of the volume of the chamber, *i.e.* about 550 liters, it will be seen that a change of 0.1 millimeter in pressure corresponds to a variation in volume which, as will appear later, affects the measurements of the oxygen consumption by about 72 c.c. Accordingly we recommend the use of the highest grade standard barometers, with special illumination and lens attachment to read to 0.05 mm. Indeed, it can be said that one prerequisite of the successful use of the respiration chamber is a barometer with an exceedingly high degree of accuracy. The necessity for an accurate barometer and the significance of the barometric measurements become greater the shorter the experimental period is. If one is dealing solely with periods of two or more hours, an ordinary barometer, reading to 0.1 or 0.2 millimeters, would be sufficiently exact for the purpose, but when it is attempted to make the experimental periods as short as one-half hour, the most exact barometric measurements are necessary.

CONNECTIONS OF THE APPARATUS WITH THE RESPIRATION CHAMBER.

The universal respiration apparatus was primarily designed for studying the respiratory exchange by using nosepieces or a mouthpiece, and in the schematic outline a mouthpiece is indicated in dotted outline. When the three-way valve V_3 is turned and the coupling M is con-

* The specifications for this balance are as follows: Patent Precision Balance No. 7 II, 10 kilos., with aluminum beam and iron support, black enamelled. Manufactured by August Sauter, Ebingen, Württemberg, Germany. The sensitivity with full load is usually 0.01 gram, *i.e.* much better than the manufacturers claim.

nected with the pipe a, a, a, at the point N, the universal respiration apparatus is ready for accurate tests with nose- or mouth-breathing. All that remains is to turn the three-way valve V_4 at the proper moment so as to connect the mouth of the subject with the air-pipe. With the clinical respiration chamber, however, the apparatus is used in an entirely different manner. As seen by the diagram, the main ventilating current of air, instead of passing continuously through the spirometer, is so deflected by the valve V_3 as to pass directly from the chamber to the rotary blower without passing through the spirometer. Furthermore, the returning air, instead of passing along the pipe a, a, a to the spirometer, goes directly to the chamber through the pipe Y, Y. With this form of connection, therefore, the pipe a, a, a, serves simply as a lead from the chamber directly to the spirometer, which is no longer a part of the ventilation circuit, but has become a true expansion chamber connected with the large respiration chamber.

RESPIRATION CHAMBER.

The respiration chamber is the new part of the clinical respiration apparatus, although here again this is, in a certain sense, but an elaboration of the smaller chambers used for small animals or, more especially, a modified form of the chamber of the bed calorimeter. From the clinical standpoint the chamber is the most important feature of the apparatus.

In designing the respiration chamber an effort was made to secure the perfect comfort of the subject, suitable illumination, absence of psychical unpleasantness or suggestion of confinement and, at the same time, as small a volume of extraneous air as is consistent with these prerequisites. It was necessary that it should be so arranged as to be quickly opened and closed, and that it should be capable of ample ventilation, not only as to the renewal of the air, but as to the movement of the air inside the chamber. Finally, it should be so constructed as to permit quick temperature control.

To meet these conditions a chamber was constructed of sheet copper, 0.5 millimeter thick. This chamber, which is shown in diagram in the lower part of Fig. 1, is in two parts, a base consisting of the bottom of the chamber together with a deep water seal, and the cover of the apparatus. The inside of the chamber is 200 centimeters long and 65 centimeters wide. The cover is curved and so constructed that it rests in the water seal; the closure between the cover and the base is therefore air-tight.* The highest point of the cover is 52 centimeters from the bottom and the radius of curvature of the top is 34 centimeters. The pipe a, a, a, which leads directly to the spirometer or tension-equalizer and provides for the sudden expansion or contraction of the air inside the chamber, enters through the cover near the ventilating fan i.

The base is substantially mounted on wooden supports h, h, h. Through the bottom are conducted the pipes for the ventilating air-current, including the intake pipe Y and the outgo pipe X. Three small tubes, b, b, b also project through the bottom. These may be used for connection with the stethoscope, the pneumograph, or for any other purpose.

There are in addition several openings in the cover of the apparatus. A window of plate glass c is placed in a recess of the cover and made thoroughly air-tight with physicists' wax. This may be easily tested at any time by pouring a centimeter of water, d, over it. Provision is made for the insertion of the thermometers and psychrometer and for the insulated connections for the electric fan used inside the chamber. In the top of the cover is a small water-sealed opening e, which may be used to pass in or take out small objects, such as a clinical thermometer, a glass of water, urine bottles, or similar articles. This small opening, or hand-hole, is of much practical benefit, also, in removing the cover from the apparatus, for if this hand-hole is not opened, it is practically impossible to lift the cover of the apparatus out of the water seal, owing to the atmospheric pressure. By simply removing the cover of the hand-hole the entire cover of the apparatus may be lifted off in a few seconds without disturbing either the thermometers or the electrical connections. Experience has shown that it is possible to converse freely with the occupant of the chamber without a telephone, and the large window immediately above the subject gives an appearance of light and freedom, with absence of psychical disturbance, which is very much to be desired.

With this hermetically sealed chamber it is obviously necessary to provide for a ventilating air-current and oxygen supply, unless the principle of Kaufmann* is employed and the carbon dioxide is allowed to accumulate. This respiration chamber lends itself admirably to tests by the latter method, if they are desired, as the spirometer which is directly connected with the chamber allows for an expansion of the air without loss of carbon dioxide or a diminution of air. Such an experiment is, of course, limited by the increment of the carbon dioxide percentage. In actual practice, however, we invariably ventilate the chamber by means of the universal respiration apparatus as shown in Fig. 1 and already described. Final adjustment of the pressure inside the chamber is obtained by means of the petroleum manometer T (Fig. 1). While the manometer is shown here as attached near the spirometer S, it may be located at any point near the large chamber without af-

* As the water seal has considerable depth, the apparatus may be adjusted for large subjects by lifting the cover at either end, or as a whole, by means of the pulley arrangement referred to later in giving the routine of an experiment, or by supports placed in the water seal. In thus increasing the volume of the chamber it is necessary only to make sure that the depth of water over the lower edge of the cover is sufficient for the complete exclusion of air. This will be found especially convenient in cases of obesity or for heart cases. Usually it will be sufficient to lift only the head end of the cover. The increase in the apparent volume of the chamber is readily corrected for by a simple calculation.

fecting the principle underlying the method of measurement.

CIRCULATION OF AIR INSIDE THE CHAMBER.

To provide a gentle movement of the air which shall aid in the temperature control, thoroughly mix the air in the chamber, and maintain comfortable conditions for the subject, a rotary air impeller, i, of a standard type is installed inside the cover of the chamber. The discharge from the blower is directed towards the curvature of the top in such a way as to blow directly on the wet bulb thermometer and provide for the maximum air movement and equalization of both temperature and composition of air. It is necessary to operate this blower a half hour before the experiment begins so that it may be thoroughly heated to its ordinary running temperature.

TEMPERATURE MEASUREMENTS AND CONTROL.

An accurate and rapid temperature control for this chamber is of fundamental importance, even more important, in a sense, than the comfort of the subject, for to obtain an exact measurement of the oxygen consumption, the difference between the average temperature of the air inside the chamber at the beginning and that at the end of an experimental period must be accurately known. Theoretically an electrical resistance thermometer is to be preferred for obtaining these temperatures. As it was undesirable to complicate the apparatus further by the addition of an electric equipment of this type, four good mercury thermometers, graduated in 0.1° C., have been used and found to serve the purpose admirably. These are placed at different points in the chamber, the locations being indicated in Fig. 1 by t_1, t_2, t_4, and t_5. The average readings of these four thermometers give a most satisfactory measurement of the average temperature of the air in the whole chamber, particularly when the subject has been in muscular repose for at least 10 minutes prior to the final reading.

To control the temperature normally the temperature environment of the room is held at such a point as to allow for a rate of normal heat radiation which will keep the temperature of the air inside the chamber not far from 22° to 23° C. In winter this is readily accomplished by a simple adjustment of the windows in the room. In summer it is more difficult, but for the greater part of the year it has been found practical to bring away the heat when necessary by placing a piece of moist cheese cloth over a portion of the top and directing the current of an ordinary electric fan over the surface. In all but the hottest days of the summer this method has proved most satisfactory. In any event, the rapid movement of a current of air over the outside surface of the chamber, either with or without the use of the damp cheese cloth, assists greatly in the temperature regulation. As will be seen later, however, the distribution and sensitivity of the thermometers is such as to compensate for considerable temperature change without affecting the measurements.

METHOD OF RECORDING THE PULSE-RATE.

An accurate record of the pulse-rate is of fundamental importance in all metabolism experiments and is an essential feature of practically every experiment in this laboratory. The usual method employed for such measurements, and the method which was used in the experiments with the clinical respiration apparatus, is for an observer to listen to the heart beat through a Bowles stethoscope attached to the chest of the subject. Connection with the earpiece used by the observer is easily made without change in the air-content of the chamber by means of one of the small tubes passing through the bottom of the apparatus (see b, b, b).

GRAPHIC RECORD OF THE MUSCULAR ACTIVITY.

Practically all respiration experiments with the subject in the lying position are for comparative purposes; an attempt is therefore made to have as nearly as possible identical conditions. A prerequisite for all comparison experiments is that the subject should be in complete muscular repose. The opinions of various experimenters as to what constitutes complete muscular repose vary greatly; hence it has been necessary to obtain some graphic registration of the degree of repose. In experiments with respiration chambers two methods have been used for this purpose, either a Fitz pneumograph placed about the chest or thighs of the subject, or in both locations, and suitable connection with tambours and kymographs to give a graphic record of the movements, or the method used with the clinical respiration chamber, *i.e.* a special form of bed upon which the subject lies, with springs and bearings so adjusted that the slightest change in the centre of gravity in a lateral direction instantly registers by changing the compression of a small rubber ball connected with a tambour and kymograph. With this latter arrangement the slightest muscular movement, even of the hand or foot, is instantly recorded, and occasionally even the respirations have been noted. Respiration experiments without such graphic proofs of the muscular repose are, we believe, entirely worthless.

METHODS OF TESTING THE APPARATUS.

The universal respiration apparatus and chamber just described, although extremely simple in principle, nevertheless have certain complexities. For experiments with patients, therefore, it is necessary to test completely the feasibility of the apparatus for measuring or indicating the several factors. Tests for the efficiency of the absorbing vessels have already been described in connection with the detailed

description of the universal respiration apparatus. Since this method of measuring the respiratory exchange involves a closed ventilating air circuit and depends upon the measurement of the amount of oxygen introduced, any leakage of air either into or out of the chamber would vitiate the whole experiment. It is, therefore, of prime importance to know that the apparatus is absolutely air-tight so that when the cover is properly in place, no air can enter or leave the circulating air-current. Fortunately such tests are very readily made with this type of apparatus.

TESTS FOR TIGHTNESS.

By a consideration of the diagram given in Fig. 1, it will be seen that the entire ventilation current is in a closed circuit, the tension-equalizer or spirometer allowing the volume to expand or contract according to the variations in temperature, pressure, or actual volume of air inside the system. By reading the millimeter scale over which the pointer on the spirometer bell passes, variations in the apparent volume of the air in the chamber may easily be noted.

To test the tightness of the apparatus, the various parts are connected as in an experiment with a subject, and the ventilating air-current started. After the first few minutes, during which the air throughout the whole system will be attaining equilibrium, the bell on the spirometer should reach a constant level, and thereafter the volume of air should remain absolutely constant unless affected by changes in temperature or atmospheric pressure, these being indicated by the readings of the barometer and the several air thermometers. If the changes in the position of the spirometer bell cannot be accounted for by temperature or barometric changes, there is obviously a leakage of air into or out of the system, usually the latter. This may be found by testing the universal respiration apparatus and the chamber separately.

To test the efficiency of the universal respiration apparatus, especially when trying to locate a leakage of air, a water manometer, consisting of two glass tubes connected at the bottom by a short bit of rubber tubing and attached to a suitable standard, is found advantageous. With this device the slightest leak in any individual portion of the apparatus can readily be detected by applying pressure with a bicycle pump. When the respiration apparatus has been properly installed, with accurately fitting rubber gaskets and connections, and suitable inspection is given from time to time, there is no occasion for leakage, and such an occurrence can invariably be ascribed to faulty technic.

To find whether or not the defect is in the chamber, the two ventilating pipes Y and Z (see Fig. 1) may be shut off, leaving the chamber connected only with the spirometer. Under ideal conditions, with no temperature or barometric changes, the volume of the spirometer will remain constant for an indefinite length of time. To hasten the detection of a leak, it has been our custom to place approximately 80 grams in weights upon the top of the spirometer bell and thus produce a slight pressure in the chamber. With the semi-circular window used in the earlier development of the chamber, leaks were occasionally found between the wax and the sheet of celluloid used for closure, but none were detected at any other point in the cover. In the first base constructed a leak was found by pouring gasolene into the base and noting where it escaped. The openings were so small, however, that they could not be detected by the use of water as it would not pass through them. Under ordinary conditions, if properly constructed, the chamber remains absolutely tight indefinitely, but it is desirable to inspect occasionally the wax closure of the window.

In tests for leakage, temperature and barometric changes are invariably to be expected, and hence it is necessary to compute the volume of the chamber and make corrections for these changes. The volume of the chamber may be found by simple computations based upon the dimensions of the chamber or by the chemical method of introducing a weighed amount of carbon dioxide from a small bottle of the liquefied gas and then computing the volume of the chamber from an analysis of the gas. For all practical purposes the method of computing the volume from the dimensions of the chamber is sufficiently accurate.

In testing the respiration chamber, weights have been placed not only upon the top of the spirometer bell, but likewise on the counterpoise of the spirometer so as to produce a negative pressure; indeed, tests have been made with weights in both positions. Even when there is an increased pressure inside the chamber there is no change of air from the enclosed volume in the chamber to the outside air, thus showing that, when properly constructed and tested, the apparatus is independent of external atmospheric conditions.

In actual experimenting, the spirometer is connected in series with the chamber and delicately counterpoised so that the air in the chamber is practically under atmospheric pressure. Indeed, measurable differences between the pressure in the chamber and the atmospheric pressure are not detected save by the extremely delicate petroleum manometer shown in Fig. 1.

The significance of a leak should be especially emphasized, for if the volume is reduced by the loss of air out of the system, oxygen is added to take the place of the air thus lost. As the oxygen introduced is measured by the meter and is considered as having been consumed by the subject, it will be seen that such loss of air vitiates the accurate measurement of the oxygen consumption. Conversely, if air leaks into the system the amount of oxygen added and measured is too small. So far as the respiration chamber itself is concerned one may confidently state

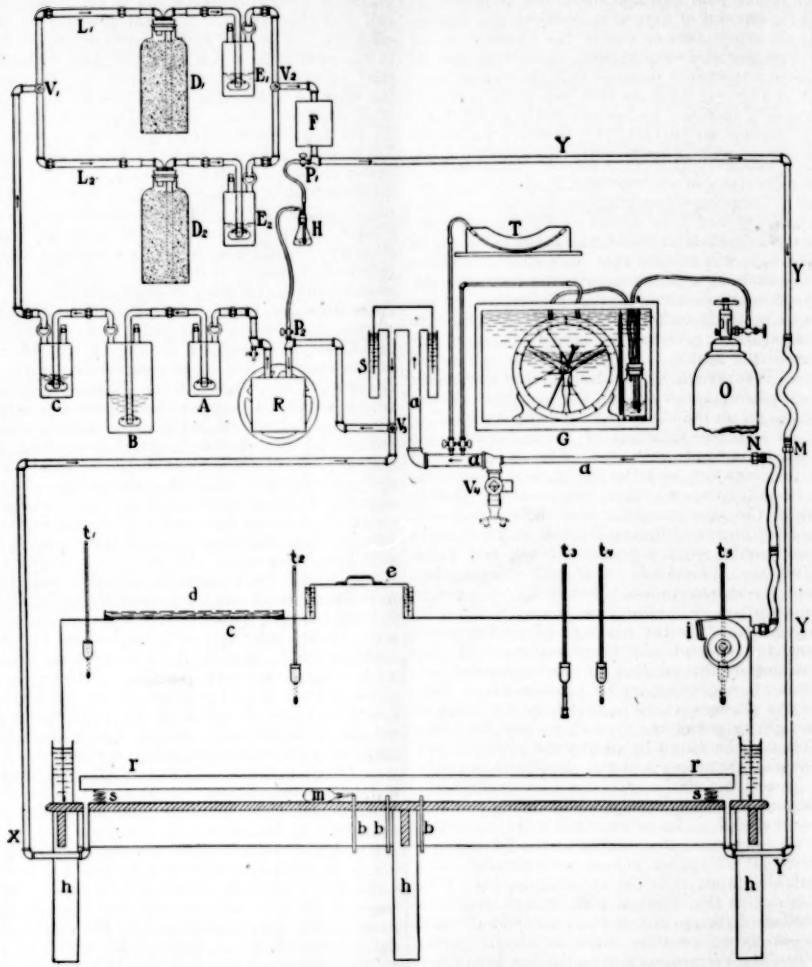


FIG. 1.—Diagram of clinical respiration apparatus.

The upper part of the figure shows the universal respiration apparatus with the following parts: R, blower, A, acid trap; B and C, water absorbers; V_1 and V_2, 2-way valves connecting with the carbon-dioxide absorbing system; D_1 and D_2, carbon-dioxide absorbers; L_1 and L_2, removable sections of the piping for the introduction of additional carbon-dioxide absorbers; E_1 and E_2, water absorbers; F, sodium bicarbonate can; P_1 and P_2, and H, pet-cocks and barium-hydroxide container for testing the efficiency of the carbon-dioxide absorbers; Y, Y, tube through which the air freed from carbon-dioxide and water returns to the chamber; M and N, points at which the tubing is connected when the apparatus is used with a mouthpiece or nosepieces; S, spirometer; G, gas-meter immersed in water; O, oxygen tank; T, manometer; V_3 and V_4, 3-way valves; a, a, a, tube connecting chamber with spirometer and oxygen supply.

The lower part of the figure shows the respiration chamber. X, outcoming airpipe; i, blower; e, window with water-seal d; c, hand-hole; t_3 and t_4, psychrometer thermometers; t_1, t_2 and t_5, air thermometers; h, h, h, supports for chamber; b, b, b, tubes in bottom of chamber for various connections; r, r, bed; s, s, springs; m, pneumatic bulb.

that, with proper construction, neither of these disadvantages may be expected.

CONTROL TESTS.

Having tested separately the universal respiration apparatus and the respiration chamber, and having found them tight, it is necessary to demonstrate further the efficiency of the apparatus for measuring the respiratory exchange and particularly the respiratory quotient by making a series of control tests. The control tests used for the clinical respiration apparatus were, in the main, of two types, either chemical tests in which definite quantities of alcohol or ether were burned inside the chamber, or physiological tests with animals either fasting or after surfeit feeding.

ALCOHOL CHECK TESTS.

The use of ethyl alcohol of known composition for testing the accuracy of respiration chambers is of long standing. The alcohol test may be used in two ways. When the respiratory quotient is alone of interest, alcohol may be burned in the chamber and from the ratio between the carbon dioxide produced and the oxygen consumed, the accuracy of the apparatus for studying the respiratory quotient is determined. Thus the theoretical respiratory quotient of alcohol is 0.667. In other words, for every liter of oxygen absorbed in the combustion of alcohol there should be produced 667 c.c. of carbon dioxide. In this type of test it is unnecessary to note the weight of alcohol burned as only the ratio between the oxygen and the carbon dioxide is desired. This test is made very rapidly, and if there is a leak in the chamber or an error in the oxygen introduction or in the absorption of carbon dioxide, the respiratory quotient of the alcohol will be distinctly affected. During the winter of 1914-15, a very large number of alcohol check tests of this type were made in which respiratory quotients materially different from the theoretical quotient were but rarely found.

The second type of alcohol test includes the measurement of the amount of alcohol introduced. From the weight of alcohol used, together with its specific gravity and percentage composition, the theoretical value for the carbon dioxide produced, and the oxygen consumed may then be computed, and these values in turn compared with those actually found by measurement with the respiration chamber. The results obtained during most of the winter of 1914-15 for this type of experiments were distinctly unsatisfactory, for almost invariably only about 95% of theory was found, although usually the same error was observed for both the carbon dioxide and the oxygen. The discrepancy was finally explained by the fact that the burette through which the alcohol was introduced into the chamber had been subjected throughout the tests to the rapid current of air produced by the fan used outside of the chamber for equalizing the temperature conditions. This caused a vaporization of alcohol from the burette, which does not occur under the usual conditions of making alcohol check experiments. During the summer of 1915 alcohol check tests were made frequently with this apparatus by Mr. L. E. Emmes and Miss M. A. Corson of the Nutrition Laboratory staff, and theoretical values were regularly found for both the carbon-dioxide production and the oxygen consumption. As during the winter we were unable to locate the difficulty, recourse was had to tests with ether.

ETHER TESTS.

The use of pure ether for testing the accuracy of the respiration apparatus was, we believe, first noted in the description of the original universal respiration apparatus.[7]. For testing the original apparatus a small combustion chamber for burning ether was devised. Practically the same principle as there described was employed in the tests of the clinical respiration apparatus except that small glass bottles with stopcocks fused into them were substituted for the sulphur-dioxide tubes previously used.

The arrangement for conducting these ether tests is shown in Fig. 2. A small current of air was taken from a petcock inserted just before the valve V_1 in the pipe leading to the carbon-dioxide absorbing system. (See Fig. 1.) This air, which is normally under pressure, was made to bubble at will through either one of two weighable glass bottles, B or B′, containing ether, the flow being controlled by the stopcocks A and A′. As the air bubbled through the ether it became saturated with ether vapor, and this gas was passed through the tube b in the base of the chamber to a micro Bunsen burner G inside the chamber, protected from drafts by wire gauze. At the end of each experimental period the current of air was deflected from one glass bottle to the other. In this deflection it was quite possible that, even with the most favorable conditions, the burning ether flame would be extinguished; accordingly provision was made, as in earlier ether tests, for keeping up the ignition by a high tension electric spark from the terminals of two well-insulated wires w, w passed through the base of the chamber. Under these conditions ether could be vaporized and burned inside the chamber in known amounts at will.

The results of a typical ether test made by this method are recorded in Table II, and show that the apparatus gives most satisfactory results not only for the respiratory quotients of burning ether, but likewise for determining the total amounts of carbon dioxide produced and oxygen consumed for comparison with the theoretical amounts. In consideration of the results obtained in these ether tests, we felt justified in believing that our apparatus was structurally and technically sound for the determination of respiratory quotients, and that we could proceed with the physiological tests.

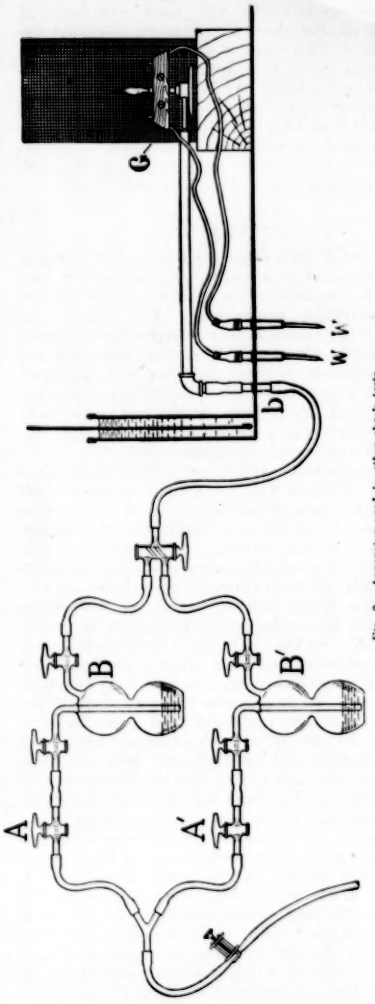


FIG. 2.—Apparatus used in ether check tests.

B, B', ether reservoirs; A, A', stopcocks controlling the flow of air and ether vapor; b, opening through which ether vapor is introduced into the chamber; G, micro Bunsen burner with wire gauze screen; W, W, high tension sparking current.

PHYSIOLOGICAL TESTS.

Naturally the first physiological tests were those made with human subjects. It so happened that certain of the individuals first placed inside the chamber were patients with severe diabetes with whom respiratory quotients were obtained which seemed to us at that time abnormally high. These diabetics had been subjected by Dr. Elliott P. Joslin to the most interesting and successful Allen treatment which, as will be seen later, almost invariably results in increasing the respiratory quotient. Since the quotients were so much higher than those obtained in previous experiments in this laboratory with severe cases of diabetes, a strict search was made for possible physiological errors in the use of the apparatus,* a number of tests being made with animals.

One of the first tests was made with a dog who had been without food for some hours. This gave a series of quotients of 0.75, which was fully in line with what would be normally expected. As the Nutrition Laboratory has for the past two years made a large number of experiments with fasting geese and also with geese after surfeit feeding, the preliminary experiment with a dog was immediately followed by a long series of experiments with geese. Usually six fasting geese were placed in a special cage and put inside the clinical respiration chamber. The respiratory quotient was then determined under various conditions of temperature, ventilation, humidity and duration of fasting. The quotients for the experiments with geese are given in Table III. The results, when compared with

TABLE III.—SUMMARY OF MEASUREMENTS IN A TYPICAL EXPERIMENT WITH FASTING GEESE† IN THE CLINICAL RESPIRATION APPARATUS, MARCH 5, 1915.

Duration of Period.		Carbon Diox. Produced.	Oxygen Consumed.	Respiratory Quotient.
Mins.	Secs.	Liters.	Liters.	$\frac{CO_2}{O_2}$
46	36	8.66	12.06	0.72
45	38	8.02	11.04	.73
47	36	8.09	11.47	.71

† Ten geese which had been without food for about 11 days.

respiratory quotients obtained for the same geese in long experiments with the bed calori-

* The apparently abnormal respiratory quotients obtained with the cases of severe diabetes led to a careful comparison of this apparatus with the universal respiration apparatus with mouth- and nose-breathing and particularly with the Tissot respiration apparatus. In these comparisons we were especially aided by Mr. H. L. Higgins; our thanks are likewise due to Dr. T. M. Carpenter and particularly to Dr. E. F. DuBois, for their helpful criticism. Dr. Elliott P. Joslin not only gave freely of his advice and experience but was also a subject for some of the comparison tests.

TABLE II.—SUMMARY OF MEASUREMENTS IN A TYPICAL ETHER CHECK TEST OF THE CLINICAL RESPIRATION APPARATUS.

Date. 1915.	Duration of Period.		Ether Burned.	Carbon Dioxide Produced.		Oxygen Used.		Respiratory Quotient (Theory 0.666).	Percentage Found	
				Found.	Theory.	Found.	Theory.		Carbon Dioxide.	Oxygen.
	Mins.	Secs.	Gms.	Gms.	Gms.	Gms.	Gms.			
Jan. 8.....	51	4	10.12	23.38	24.04	25.87	26.23	0.657	97.3	98.6
	56	29	10.18	24.00	24.19	26.06	26.38	0.670	99.2	98.8
	51	19	8.67	20.78	20.60	22.67	22.47	0.667	100.9	100.9

meter, were found to be practically identical, thus verifying the results obtained with the clinical respiration apparatus.

As a supplementary study an attempt was made to alter arbitrarily and definitely the respiratory quotient of geese by surfeit feeding. Again it was found that the respiratory quotients which had been observed with the bed calorimeter were likewise obtained under similar conditions with the clinical respiration apparatus. Finally a man was placed inside the chamber, and after the respiratory quotient had been determined in a series of periods to provide a base line, a sugar solution was given. Following the ingestion of sugar, the same elevation of the respiratory quotient was observed as had repeatedly been found in similar experiments with other types of respiration apparatus in this laboratory.

REFERENCES.

[2] Benedict and Homans: Jour. Med. Research, Vol. xxv, p. 409, 1912; Benedict and Talbot: Carnegie Institution of Washington Publication No. 201, 1914, p. 31; also, Am. Jour. Diseases of Children, Vol. iv, p. 129, 1912, and same journal, Vol. viii, p. 1, 1914; Benedict: Jour. Biol. Chem., Vol. xx, p. 301, 1915.
[3] Benedict: Deutsch. Archiv. f. klin. Med., cvii, p. 156, 1912.
[4] Benedict: Physical Review, Vol. xxii, p. 294, 1906.
[5] Benedict: Deutsch. Archiv. f. klin. Med., cvii, p. 156, 1912; Benedict and Talbot: Carnegie Institute of Washington Publication No. 201, 1914, p. 43; Carpenter: Carnegie Institution of Washington Publication No. 216, 1915, p. 37.
[6] Kaufman: Archiv. de physiol., Vol. viii, p. 329, 1896.
[7] Benedict: Am. Jour. Physiol., Vol. xxiv, p. 372, 1909.

(To be concluded).

CHOLECYSTOSTOMY VS. CHOLECYSTECTOMY.*

BY F. B. LUND, M.D., BOSTON.

ON no important question in surgery is there less agreement among men of experience and skill than on the indications for cholecystectomy. In the early days of operative interference, cholecystostomy was always done and the removal of the gallstones was thought to be the important matter, and was so, fortunately, in a majority of the cases. As time went on, however, we were confronted with gallstones without symptoms, symptoms without gallstones, recurrence of symptoms after removal of gallstones; nay even with recurrence of gallstones after operation, and even the post-operative development of cancer. We learnd that, while gallstones crystallized around clumps of bacteria and epithelium, and were, therefore, the result of infection, infected bile being found in a majority of acute cases, and the bacteria ranging from streptococcus to the influenza bacillus, the real infection which produced cholecystitis came by the blood stream and was situated in the walls of the gall-bladder and not in its interior; that drainage would naturally then only temporarily relieve the symptoms superinduced upon a cholecystitis by the plugging of the cystic duct by a stone; and that unless the infection subsided, it was not curative. The enlargement of the glands about the cystic and common duct is evidence of infection. The advantages of cholecystostomy were and still are: (*a*) that it is often a simpler and safer operation, especially in fat patients with deep chests and high livers, the not infrequent bronchitis, nephritis, etc.; (*b*) that it provides an easy drainage to the surface for septic bile which has been blocked off by obstruction of the common duct due to stone or external pressure; (*c*) that in case of (1) stricture of the common duct, or (2) pancreatitis, it affords a simple and comparatively safe method of relieving the condition. In regard to advantage (*a*), the easier technic, it may be said that increased familiarity with the operation has enabled many surgeons to acquire such skill in cholecystectomy that in a large proportion of cases, it is as simple and safe as cholecystostomy; the choice of the suitable cases requiring a real surgeon, however, and not an amateur. In regard to (*b*), drainage of bile, we must admit that in case of cholecystitis without jaundice, the supposed necessity of the drainage of bile was an error. Why drain outside when the common duct is clear and the bile passing freely into the duodenum? Can we not remember the weeks of bile drainage to which our unfortunate patients used to be subjected? The cases in which we remove the gall-bladder and tie the cystic duct do just as well. Often no bile drainage takes place and the wound heals quickly; often in a few days there is a gush of bile along the drain carried down to the duct; in other words, if drainage is needed, it takes care of itself.

(*c*) The need of the gall-bladder for purposes of duodenostomy for common duct stricture or pancreatitis; this is not really against cholecystectomy in suitable cases, but against its indiscriminate employment in cases where common duct stricture is likely to develop or in which pancreatitis is present.

In a case where stones in the common duct require an incision therein, there is always a possibility of stricture, and in these cases the gall-bladder, unless too hopelessly diseased, should be spared. It may be needed for a second cholecystenterostomy. In cases in which we find a swollen pancreas, the so-called interstitial pancreatitis, the gall-bladder should also be drained and not removed, because we may need it for a subsequent cholecystenterostomy. Unless we have stones actually in the common duct and have to open it, we need not worry about stricture of the duct developing. In cases of simple cholecystitis, the removal of the gall-bladder will be a preventive treatment for common duct disease, for it will prevent recurrence of stones, with the possible entrance of the

* Discussion before the American Gastroenterological Association, Washington, D. C., May 8, 1916.

latter into the common duct, with the results hereinbefore mentioned. Unfortunately, in a large majority of cases of common duct stones, the gall-bladder is so thickened and contracted that its efficient use for drainage is impossible, and the question of removal is, therefore, not affected by these considerations.

The recent experimental demonstration that after cholecystectomy in animals a so-called compensatory dilatation of the common duct occurs, has led to the suggestion that cholecystectomy instead of cholecystenterostomy would be the proper procedure in chronic pancreatitis. The loss of the function of the gall-bladder as a pressure regulator is the alleged reason for the dilatation of the common duct after its removal. It seems doubtful if the dilatation would take place under the actual conditions of pressure on the thin-walled duct by the swollen head of the pancreas. As a preventive of pancreatitis, however, the removal of the gall-bladder, by favoring dilatation of the duct and providing free drainage, would appear to have a favorable influence.

We all remember that on largely empirical evidence some fifteen or eighteen years ago, certain surgeons were advocating the removal of the gall-bladder in the majority of gallstone cases, and that for years the influence of the Mayo Clinic was against this, as not providing drainage. Accumulated experience, however, has shown that recurrence of symptoms after cholecystostomy, especially in cases of cholecystitis without stones, is far from uncommon. Certain men of experience have roughly rated it as 25%. The reason for this is evident, if, as we now believe, the infection is in the wall of the gall-bladder and not in the bile. Actual recurrence of gallstones is also not uncommon. I have personally re-operated and found gallstones from five to six years after operations of my own, in which I feel certain the stones reformed and were not left behind.

The subsequent development of cancer in a gall-bladder from which stones had been removed has occurred five times in my experience.

We learn now that the procedure in the Mayo Clinic has so changed that cholecystectomy is performed in 90% of the cases, an interesting commentary on the modern trend; but we also learn that many surgeons of prominence and skill do not endorse cholecystectomy in so large a proportion of cases.

In the matter of the advantages, and, what is even more important, the safety of cholecystectomy in any given case, the surgeon must be his own judge, using his own experience and knowledge as his guide. Blind adherence to the so-called dictum of any authority is not only unsafe but often fatal in this most complicated, interesting, and important branch of our art.

Cholecystectomy is indicated in the following cases:

1. In cases of very thick, acutely inflamed, bright-red, or gangrenous gall-bladders due to impaction of a stone in the cystic duct.

2. In cases of chronically thickened gall-bladders. Here (*a*) the thick walls cannot contract and drive out the bile, so that what bile gets back into the gall-bladder it is sure to stagnate there; and (*b*) after cholecystostomy, the walls do not contract, so that we get a mucous sinus for a long time or forever.

3. In cases of gall-bladders very much distended with clear fluid from impaction of a stone in the cystic duct. Here the duct has been closed and probably ulcerated and strictured by the irritation of the stone, so no bile gets back. In these cases, removal is usually technically simple.

4. Whenever suspicion exists of malignant disease.

5. In chronic cholecystitis without stones, but with moderate thickening and ulceration of the mucous membrane, giving little yellow spots on the mucous surfaces, the so-called "strawberry gall-bladder." These do not get well with drainage alone.

6. In chronic cholecystitis without stones but with adhesions to the surrounding organs, especially the pylorus, which cripple the latter and cause symptoms. Here, also, drainage alone is only temporarily efficient. The gall-bladder is a constant focus for low-grade infection and adhesions, which will continue to form and perhaps to spread until its removal; all these processes being attended with discomfort and invalidism to the possessor of the organ.

Clinical Department.

REPORT OF A CASE OF SACRO-ILIAC STRAIN FOLLOWING SYMPHYSIOTOMY.

BY CHARLES F. PAINTER, M.D., BOSTON.

THERE have been differences of opinion in the medical profession regarding the possibility of lesions of the sacro-iliac joint ever since attention was called to its possible injury or luxation. By a considerable part of the profession there has been a tacit agreement that lesions of this articulation are possible; that in a certain few instances such lesions as have been described are demonstrable by physical signs peculiar to themselves, but in a majority of cases the diagnosis of this condition will have to be made upon the results of treatment of a like nature to that which admittedly brings relief to patients who have demonstrable sacro-iliac disturbance. A small part of the profession rejects the evidence offered to prove that such lesions exist, whereas a very few, among whom are some anatomists,

declare emphatically that such lesions could not possibly occur because there is no such thing as a sacro-iliac joint and there is no mobility possible between the bones in this region. It is in accordance with the history of many new conceptions in medicine that this should have been received in this manner. It is time, however, for one who seeks to interpret clinical observations in this region to abandon the ground that there can be no such lesions, because there is no such joint, for both the existence of the joint and the possibility of motion in it are capable of proof. It is true that the joint is not like any other joint in the body, though it possesses ligaments and interarticular structures that are similar to, if not a duplication of, the tissues interposed between bones in any of the other large articulations. I fancy that the reluctance to accept, as proof, any of the arguments offered to establish the identity of this joint rests upon the feeling that in order to predicate an articulation one must be able to demonstrate motion between the bones that compose it. The very nature and location of this particular articulation make it impossible to demonstrate such motion by the pursuit of those methods ordinarily applicable to a joint in which it is desired to demonstrate mobility. As for dislocations of the sacro-iliac joint, they undoubtedly do not occur except where the violence is very great, so great in fact, as to crush the pelvis more or less extensively. The slight luxations which may occur and which are consistent with the structure of the sacro-iliac joint could not reasonably be expected to give rise to any outward evidence of their existence. In any of the joints of the body at which luxations or dislocations occur the degree of the displacement is, in a way, proportionate to the amount of motion of which the joint is capable. A joint with a small range of motion would be capable of being displaced to a very slight degree. A deeply-seated joint, such as the sacro-iliac, possessing only the slightest possible motion, shows practically no sign that could be interpreted to mean luxation. Even the radiograph reveals nothing, for the reason that those indications which might be looked upon as evidences of this are so slight that they are well within the limits of error in the taking of pictures and could not fairly be admitted as evidence on this point.

It is because so much question has been raised by those who are skeptical about the existence of sacro-iliac mobility that the following case seemed to be worth reporting. The existence of motion in these joints was first claimed by obstetricians. That, as has already been said, there is no demonstrable motion recognizable by any tests that it is possible to make in the normal individual is unquestionably true. Occasionally in very severe traumatisms there is an actual displacement of these articulations such as has been seen in cases where fractures of the pelvis have been sustained. Chronic sprains of the sacro-iliac joints are not uncommon and in these cases the evidence of the effect of slight mobility in these articulations is clearly shown by the production of lipping at the periphery of these joints.

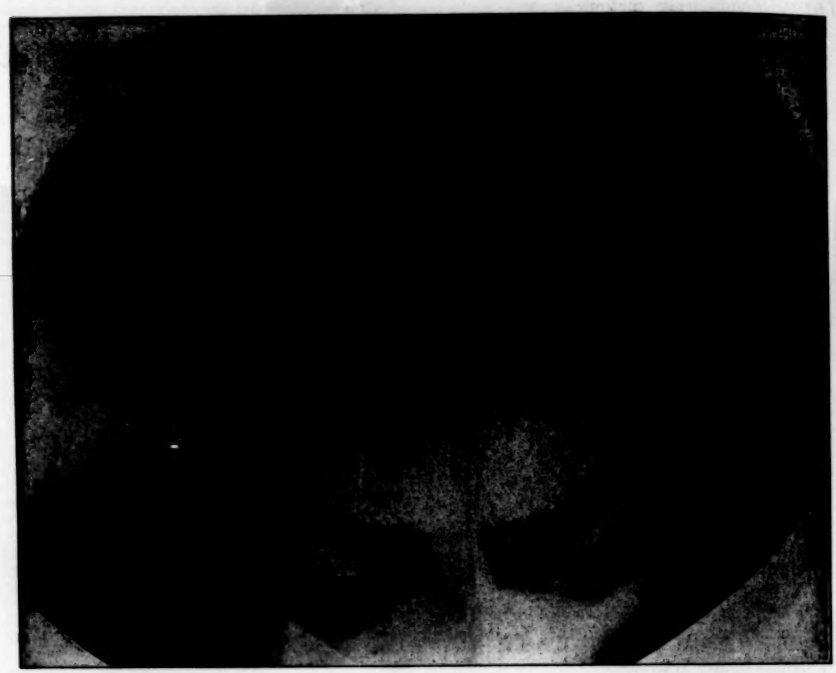
The patient who is the subject of this report is a young married woman of 30 who had her first child four years before she was examined by the writer. She was of a rather high strung, nervous type, who had never had any serious illness. During her pregnancy there were no unusual phenomena noted. The labor proved so difficult that symphysiotomy was employed as the measure likely to bring the best result to child and mother. Convalescence was very slow and painful, and she experienced great difficulty in walking. She was almost paralyzed in both legs. Pain in the lower back was severe, and there was pronounced sense of instability in the low back and hips. She had been a very active woman, and the discomfort caused by the attempt to follow out the accustomed activities of her life plus those incident to the care of an infant wore on her a great deal, and made a nervous invalid of her after two years. She persisted in being active partly because she thought she ought, and partly as a result of advice given her on the basis of her neurasthenic tendencies. The physical exhaustion following upon the forced activities which were prescribed and the pain referred to the lower back, buttocks and thighs, finally forced her to give up, and it was at this juncture that the writer first saw her in the fall of 1914.

She was an extremely healthy appearing young woman. Color good, rather over weight, but of fair muscular tone. In walking there was no notable disturbance of the gait. The back on inspection presented nothing abnormal either in contour or mobility. There was tenderness to deep pressure over the base of the sacrum and along the line of juncture of the sacrum with the ilia. When lying down thigh flexion with the extended leg caused some pain in the low back and at the symphysis pubis. It was also slightly tender over the symphysis to deep pressure. Motion of the hips in all direction was normal. Forced hyperextension of the thigh caused pain at the symphysis pubis.

An x-ray of the sacro-iliac region shows a wide separation at the symphysis (nearly one inch), and a marked lipping of the sacrum and ilia at the sacro-iliac joints, caused apparently by the abnormal mobility, slight though it was, of these articulations resulting from the separation at the symphysis. The sense of insecurity in the pelvic joints was undoubtedly explained by this abnormality.

As she was too stout for mechanical measures to offer very much likelihood of relief, it was decided to try and render the pelvic articulations more stable by wiring the symphysis. The day before the operation a plaster model of the lower back, the buttocks and both thighs was taken. This was re-inforced on the posterior half and the anterior half was cut away so that after the operation she could be made to lie in this plaster shell.

Under ether anesthesia a transverse incision was made over the symphysis about 4½ inches in length. The two bones were found separated somewhat more than an inch and the intervening space was filled with fibrous tissue. By lateral compression over the trochanters after the removal of the fibrous tissue and refreshing the ends of the bones so that the cartilaginous surfaces were roughened up somewhat, it was possible to press the ends of the rami



Note the lipping of the bone at the lower end of the sacro-iliac joints. Also observe the separation at the symphysis pubis. The pubic bones are certainly three times as far apart as the normal.

of the pubes almost together. A heavy silver wire was passed through each ramus about ¾ of an inch proximal to their articulating surfaces, and while the bones were crowded together by an assistant, the wire was drawn tight and twisted with the knot on the side away from the pelvis. A few stout animal tendon sutures were made to bridge over the gap and reinforce the silver wire. The wound was closed tightly with silk worm gut and a tight swathe was applied, exerting its pull on the pelvic bones in such a fashion as to prevent their gaping. The patient was put back to bed in her plaster, posterior shell, and compelled to maintain that position for two full weeks. At the end of that time she was permitted to be moved a little from side to side, still in her cast. Convalescence was uneventful except for some difficulty in micturition at first. This was overcome in a few days. At the end of three weeks she was removed to her home, and for the next six weeks she remained recumbent. After that, for the following month, she moved cautiously and gradually improved, so that she went about more and more. Her nervousness became less and she was able to walk with freedom and quite comfortably.

She has now no trouble at the seat of the suture and she can walk just about as rapidly and as well as ever. There are now no symptoms and the patient is quite as active as her custom had been.

As has been said earlier in the paper, one of the most striking features in the case has been the evidence of hypermobility at the sacro-iliac joints; this was associated with a severe backache and gave ocular evidence of its existence by the pronounced lipping of the sacro-iliac joints, as shown by the x-ray. It may be maintained that, even though one admits the validity of the claim that motion in these joints is evidenced by the lipping of the bones making up the joint, this is due to the fact that there was no connection at the symphysis. There never is a bony connection and though the abnormal separation in this patient may, and undoubtedly did, aggravate the already existing mobility, still there is abundant evidence that these joints are in existence and I submit have been subjected to the diseases to which other joints of the body have been subjected. No better evidence is needed than this in proof of the existence of these joints; and if joints, then motion must follow to some degree at least.

Such a case as this cannot, now at least, be of very common occurrence. Aside from its interest from the clinical standpoint, it has been very instructive as furnishing proof of the reality of mobility at the sacro-iliac joints, thus going far to prove that though unlike other articulations they resemble them in their essential features.

THE BOSTON
Medical and Surgical Journal
Established in 1828

An independently owned Journal of Medicine and Surgery, published weekly, under the direction of the Editors and an Advisory Committee, by the Boston Medical and Surgical Journal Society, Inc.

THURSDAY, JUNE 22, 1916

Subscription Terms: *$5.00 per year, in advance, postage paid, for the United States. $6.56 per year for all foreign countries belonging to the Postal Union.*

An editor will be in the editorial office daily, except Sunday, from twelve to one-thirty p. m.

Papers for publication, and all other communications for the Editorial Department, should be addressed to the Editor, 126 Massachusetts Ave., Boston. Notices and other material for the editorial pages must be received not later than noon on the Saturday preceding the date of publication. Orders for reprints must be returned in writing to the printer with the galley proof of papers. The Journal will furnish one hundred reprints free to the author, upon his written request.

The Journal does not hold itself responsible for any opinions or sentiments advanced by any contributor in any article published in its columns.

All letters containing business communications, or referring to the publication, subscription, or advertising department of the Journal, should be addressed to

Ernest Gregory, *Manager,*

126 Massachusetts Ave., Corner Boylston St., Boston, Massachusetts.

AMERICAN MEDICAL ASSOCIATION.

The sixty-seventh annual session of the American Medical Association was held last week at Detroit, Mich., from June 12 to 16, and the programs of scientific sections and of affiliated and non-affiliated organizations were carried out successfully. Over 5,000 members of the Association were in attendance. Principal addresses were made by Dr. Albert L. Van der Veer, of Albany, N. Y., who succeeded the late Dr. William L. Rodman of Philadelphia as president of the Association, and by Dr. Rupert Blue, the new president.

It is interesting to compare these addresses with the annual discourse for the Massachusetts Medical Society at its recent session by Dr. David L. Edsall, which is published as the leading article in this issue of the Journal. Dr. Van der Veer spoke chiefly of medical preparedness. Dr. Edsall deals particularly with movements in medicine as they have affected the status and character of physicians, and the relations of medicine to the community. Dr. Blue, in his presidential address, perhaps with less of a backward glance, concerned himself rather with the larger problems of the medical profession now insistent for solution. At some length he considered the subjects of medical and sanitary education and preparedness, the possibilities of enlargement of the usefulness of hospitals, the improvement and standardization of medicinal preparations. He considered also the more domestic topics of health insurance, industrial hygiene, rural sanitation and public health organization. With reference to the latter he pointed out, in closing, the part which the American Medical Association, and physicians generally, should take in future efforts towards the solution of these problems.

"The great effort of the future must be in the direction of the improvement of the internal health of the nation. We are possessed of an adequate coast defense against disease from abroad, and what we must do now is to control those diseases which are already with us. In this we require the qualified health officer and the educated public. A part of this education may be secured by the printed and the spoken word, but the great agent in public education is demonstration. This Association is in a position, touching as it does every stratum of society in this broad land of ours, to carry this work forward to ultimate fruition. This is an obligation on our profession, a sacred duty laid on the followers of the healing art. Though we minister to the sick and bind up the wounded, though we bring sight to those who see not, and alleviate the suffering on the bed of pain, yet our duty is not done until we have put forth our best endeavor to the end that sickness and pain and blindness be not. Poverty and ignorance, squalor and intemperance, cruelty and greed,—these are the enemies which we as individuals and as a profession must combat. As citizens who would maintain our nation in a condition of preparedness against its greatest enemy,—disease,—it is our duty to perform not only our legal obligations as physicians, but to bend our every energy to the prevention of disease. No selfish or half-hearted service will suffice. Nothing short of whole-souled devotion to this duty will satisfy the ideals which have been passed down to us by generations of self-sacrificing, public-spirited physicians who love their fellow men. The American Medical Association represents the crystallization of these ideals. If it permits no self-seeking interest to dominate its actions, if it maintains its plane of high altruism, if it devotes itself with strength of purpose to the betterment of the

public weal, it will prosper in the future as in the past, serene and sure in the satisfaction of work well done. Let our deliberations be so imbued with that broad spirit of charity and brotherhood that the name of the physician shall be revered."

Dr. Blue referred also, in his address, to the death of four leading physicians in the United States during the past year, whose loss is felt by the profession at large,—Dr. Edward L. Trudeau, Dr. George M. Sternberg, Dr. Henry B. Favill and Dr. William L. Rodman.

THE PROBLEM OF THE CONVALESCENT.

IT is a common experience with those who deal with large groups of cases in the dispensary or in the open ward to feel that the cases are not properly rounded off. They get over the acute illness, the painful symptoms are relieved and, to make room for other cases, they are discharged into the world to take up the economic struggle again, unfitted though they may be. Of course in most of our private cases the period of convalescence means merely a time of idling about, reading, taking rides, the object of commiseration by friends and relatives, but in these other cases there is no such possibility. Once deprived of the care of the hospital, they must go back to their daily work again or else drift into pauperism. One would, of course, like to keep such cases in the hospital much longer, but the problem of room for the acute cases is usually an urgent one and beds are at a premium. The best we can do is to urge them to return to the hospital dispensary regularly, but we know that this is in many cases impossible.

Writing in the *Modern Hospital* for June, Dr. Frederic Brush calls attention to this problem, for which he believes there are two main methods of solution. These may be called the home and the institution methods. The home method is an amplification of the "follow-up" system of many hospitals and comprises instruction of the family in the management of such cases. The advantages are the tonic effect of "going home" on the patient, the preservation of the family, as well as its hygienic education and the economy, as compared with the other method.

The convalescent hospital is the solution of the problem for those cases not suitable for home convalescence. It is especially designed for the following classes of cases: Surgical dressing cases, selected cardiac and rheumatic cases, post-typhoid cases, tuberculosis, especially of bone and kidney, and certain mental cases. Such an institution should be located in the suburbs of a city, where it could combine plenty of acreage with accessibility to a large city hospital, with which it should be connected. Dr. Brush is superintendent of a hospital of this kind, and finds it suitable for cases recently operated on for empyema, pyelonephritis, recent fractures, and other cases not ordinarily associated with such a hospital. He finds that patients such as sailors and laborers, recovering from such a disease as typhoid, make rapid recoveries, instead of deteriorating socially, as they too often do when discharged directly into a large city; and such patients prove extremely grateful and are among the best testimonials to the efficacy of the hospital.

Dr. Brush believes that in New York about 10,000 adults should take advantage of the convalescent hospital every year, although, as a matter of fact, only 500 actually do. Cooperation must be obtained from large employers of labor, from school authorities and from social workers everywhere.

SMALLPOX IN GERMANY.

THE Imperial Bureau of Health for Germany makes an exhaustive report on smallpox in that country for the three years 1911-1913, inclusive. During this three-year period there were registered 718 cases, the best year being 1913, when there were only 90 cases, the lowest since registration began in 1896, with one exception.

The comparative frequency of smallpox among the vaccinated and unvaccinated is, of course, interesting. Unfortunately, there is no way of estimating, even approximately, the ratio of one class to the other numerically, but it seems safe to say that the vaccinated outnumber the unvaccinated by many times to one; so that when we find 113 cases among persons known to be unvaccinated and 574 among the vaccinated the superficial inference is untrue. Of the 574 among the vaccinated, too, we find nine cases vaccinated without result, 27 vaccinated too late, and 42 revaccinated too late.

There remain 235 cases vaccinated once and 261 revaccinated. In many of these cases vaccination had been done a great many years before; for instance, there were two cases of 47 and 51 years, respectively, each of whom had been vaccinated at 12.

The disease showed a much milder course among the vaccinated and the mortality was less. Thus there were 39 deaths among 113 unvaccinated, a mortality of 54.5%, while among the vaccinated ones there was a mortality of only 4.2%, and among those revaccinated it was only 3.8%. Among those cases which recovered, the disease took a lighter course in the vaccinated. In 73 unvaccinated cases, where the nature of the course was known, 40 cases were severe and 33 mild. On the other hand, of 223 cases vaccinated once, the course was mild in 159 and severe in 64. Of 251 cases revaccinated, the disease took a milder course in 192 and was severe in only 59.

The moral of the above is easy to point. It has been dwelt upon from time to time by health authorities and illustrated wherever a nation or a community issues a report such as the above; in spite of which, crusades are still organized against vaccination.

MUTISM FOLLOWING TRAUMA.

A great many conditions having their origin in emotional stress acting upon a neurotic constitution arise during the course of a great war such as the present one, and on account of their frequency are often not recognized as being identical with the same conditions appearing at intervals only in time of peace. There have been, for instance, many cases quoted of mutism following shell explosions, and the question has arisen just how much of the symptom picture is hysterical and how much is due to disturbances in atmospheric pressure acting upon the nervous system.

In the *Lancet* for May 20, Dr. Arthur J. Hall cites the case of an 11-year-old boy who was subjected to a series of emotional shocks. He was knocked down by a taxi-cab; about a year later was in Hartlepool when that city was bombarded by the German ships; and about six months later happened to be near a gunpowder explosion of great violence. He acted rather peculiarly after this, and six months later, when told that he was to undergo an operation for tonsils and adenoids, became suddenly mute and remained so for six weeks, only recovering upon receiving a severe fright.

A correspondent of the *British Medical Journal* writes from southeastern France, in the issue for May 27th, describing the case of a soldier who was buried by the explosion of a shell at Verdun, and, when disinterred, was found to be mute. He remained in this condition for two weeks. He was put at hard manual labor in a vineyard and his speech suddenly returned. It seems probable that in such cases as the above, the exciting cause is only the summation of stimuli, all of which would have been impotent, except for the neurotic background.

Hall tells us that in his case, the boy had come to dominate the household, and he truly observes that this state of affairs was probably the original cause of the condition. In the other case, the soldier retained his mutism as long as he was the centre of attention in a ward, but when put to hard work, he discarded it as a useless expedient. All this agrees very well with Adler's views on the desire of the neurotic to dominate every environment in which he finds himself—if by no other way, then by making himself difficult to deal with so that events must be ordered to adapt themselves to him.

MEDICAL NOTES.

A Large Legacy.—Report from White Plains, N. Y., on June 7, states that the will of the late Mr. George R. S. Schrader of that city, who died on November 15, 1915, bequeaths his entire estate, estimated at $3,000,000, to the New York Association for Improving the Condition of the Poor.

Northwestern Catholic Hospital Association.—The annual conference of the Northwestern Catholic Hospital Association was held in Milwaukee, Wis., on June 9, 10 and 11. Principal addresses were delivered by Dr. Henry A. Christian, Dr. John T. Bottomley, Dr. John W. Lane and Dr. Michael J. Cronin of Boston. Dr. Bottomley was elected a member of the executive board of the Association for the ensuing year.

Prevalence of Malaria, Meningitis, Pellagra, and other Infections.—The weekly report of the United States Public Health Service for June 9, states that during the month of

April, 1916, there were in Arkansas 169 cases of malaria, 59 of pellagra, and 136 of smallpox. During the same period there were in Kansas 5 cases of cerebro-spinal meningitis, 276 of smallpox and 70 of typhoid fever. There were 413 cases of smallpox in Illinois.

AMERICAN ACADEMY OF MEDICINE.—The forty-first annual convention of the American Academy of Medicine was held last week at Detroit, Mich., on June 12. At the concluding session, Dr. J. E. Tuckerman of Cleveland was chosen president of the Academy for the ensuing year, in succession to Dr. George A. Hare of Fresno, Calif., the retiring president.

NEW YORK FLOATING HOSPITAL.—The new Floating Hospital of St. John's Guild, the *Helen C. Juilliard*, was open for inspection on June 7. The Department of Health was represented by the Director of the Bureau of Child Hygiene and the Chiefs of the Division of Baby Welfare and School Medical Inspection. The boat is a model of its kind, containing all the necessary wards, apparatus and equipment for the care of 1200 persons. A unique feature is an arrangement on the backs of the benches whereby individual hammocks can be swung for the babies, keeping them directly in front of their mothers, yet giving the mothers freedom of action and a chance to take advantage of the fresh air. The Bureau of Child Hygiene co-operates regularly with St. John's Guild in distributing tickets for the daily trips made by this boat. It feels that, with the new boat and its complete equipment, great benefit will result to the babies of the city during the coming summer. As the result of contributions made by inspectors of the Department during the year 1902, the Department of Health has an endowed bed on board this boat.

ALUMNI ASSOCIATION, MEDICAL DEPARTMENT, UNIVERSITY OF BUFFALO.—At the recent annual meeting of the Alumni Association of the Medical Department of the University of Buffalo, announcement was made that pledges to the amount of $10,000 had already been obtained for the alumni fund. The following officers of the Association were elected for the ensuing year: President, Walter D. Greene, Buffalo; first vice-president, William H. Bergtold, Denver, Colo.; second vice-president, Henry A. Eastman, Jamestown, N. Y.; third vice-president, Ross G. Loop, Elmira, N. Y.; fourth vice-president, Henry A. Stadlinger, Buffalo, N. Y.; fifth vice-president, M. Louise Hurrell, Rochester, N. Y.; secretary, Julius Richter, Buffalo, N. Y.; treasurer, Frank E. Brundage, Buffalo, N. Y.; trustee for five years, Lesser Kauffman, Buffalo, N. Y.; executive committee, W. F. Jacobs, chairman, William G. Bissell, Harry R. Trick.

LOW DEATH RATE IN NEW YORK.—From figures given out by Health Commissioner Emerson, it appears that in every borough except Richmond, the New York death rate was lower last week than during the corresponding week of last year. Altogether this represented a saving of 149 lives. The death rate last week was 1.39 lower than the rate for the corresponding week of last year. This decrease is equivalent to a saving of 149 lives. In other words, had the death rate for the corresponding week of last year prevailed last week, 149 more persons would have died in the city. The death rate was 12.72 for last week as compared with 14.11 for the week ending June 12th, 1915. The total number of deaths reported last week was 1362. This reduction in the death rate was secured chiefly through a reduction in the mortality of the acute infectious diseases, of which measles, scarlet fever, diphtheria and typhoid fever showed an immense reduction. The mortality of whooping cough and cerebro-spinal meningitis was slightly higher. As might be expected with the reduction of the acute infectious diseases, there was also a reduction in the respiratory diseases, bronchitis, lobar pneumonia and broncho-pneumonia all claiming fewer victims during the past week than during the corresponding week of last year. Pulmonary tuberculosis was reported as having been the cause of death in 174 cases as compared with 159 for the corresponding week of last year. This increase, however, was practically offset by a decrease in the deaths from other tuberculous diseases. The mortality of heart disease was considerably lower, but the mortality of Bright's disease was sufficiently high to overcome the reduction in the mortality of heart disease. The death rate for the first 24 weeks of 1916 was 15.02, as compared with 15.28 for the corresponding period of 1915.

EUROPEAN WAR NOTES.

UNUSUAL FEVERS IN WAR.—In the issue of the *British Medical Journal* for May 27 are noted two recent contributions in German medical literature, describing two unusual fevers which have been observed in the Austro-German armies,—the first known as five-day fever, the second as gaiter-pain fever.

"In a German field hospital on the east front, Professor H. Werner[1] observed thirty-four cases, at first diagnosed as influenza, which subsequently showed a distinctive five-day type of fever. In each bout of fever the temperature rose to 38° to 40° C. for twenty-four hours, but sometimes for forty-eight hours. During the three to four days' interval the temperature was steady. After a succession of such bouts the temperature ceased to rise and convalescence set in. The fever was accompanied by headache and pain in the limbs. The spleen was painful and the bones, particularly the tibiae, were tender. The patients were very tired and nervous. The rigor accompanying the rise of temperature was followed by a sense of excessive heat

[1] *Münch. med. Woch.*, March 14, 1916.

and perspiration, suggestive of malaria. The enlargement of the spleen was hardly demonstrable between the attacks of fever, during which the patients were flushed. In the afebrile interval they were pale and sometimes slightly jaundiced. The pain in the limbs increased during the febrile period and did not completely cease even when the temperature was normal. The micro-organisms of typhoid fever, malaria, and relapsing fever were not found. Possibly this five-day fever was an aberrant form of relapsing fever; and it was presumably identical with the 'febris Wolhynica' described by His early in 1916.

"Under the heading 'Gaiter Pain' several Austrian writers have described a condition the most characteristic feature of which was severe pain in the shins. More than 200 such cases were observed by Dr. A. Grätzer[1] alone, from December, 1914, onwards, when his battalion was stationed on the Nida. In conjunction with Dr. Zanko he found that this 'gaiter pain' was only one symptom, among many others, of a condition to which they gave the term 'influenza polonica.' The onset of the disease was acute, the temperature being sometimes over 40° C. at the outset. Severe headache was accompanied by stabbing pain in the region of the left costal arch, by great exhaustion, and frequently at first by constipation. Apart from the high temperature and considerable enlargement of the spleen, there was little objective evidence of disease. The spleen was strikingly hard, its lower border was sharply defined, and it was very tender. Herpes labialis was observed in a few cases. After three to four days, when the temperature had fallen below 38° C. and the headache had almost ceased, pain developed on the inner surface of the tibiae, of equal intensity on both sides. It was variously described as dragging, compressing, and throbbing. Its intensity was moderate in the morning, greater in the afternoon, and often unbearable at night. During the next few days the temperature became subfebrile or normal, and the spleen smaller and less tender. Large doses of salicylates and complete rest were alike useless, and it was only with a combination of morphine and veronal that a few hours' sleep could be secured. The disease sometimes lasted four to six weeks, during which the intensity of the pain showed slight variations, and the temperature was normal, or almost normal. At the end of this period improvement or recovery occurred, but in most cases during the following months there were frequent relapses accompanied by only slight rises of temperature, and hardly ever by any swelling of the spleen. The duration of a relapse was seldom as long as three weeks, but the pain was, as a rule, just as severe as at the first attack. Dr. Grätzer found large doses of quinine, given over a long period, shortened the course of the disease, and in many cases aborted relapses. The majority of the patients had never worn any kind of gaiter, and only in the case of an officer did the distribution of the pain coincide with the area covered by his gaiters."

[1] *Wien. klin. Woch.*, March 9, 1916.

War Relief Funds.—On June 17 the totals of the principal New England relief funds for the European War reached the following amounts:—

Belgian Fund	$126,794.16
Allied Fund	119,345.82
French Wounded Fund	89,217.86
Army Hut Fund	58,225.60
British Imperial Fund	57,731.44
French Orphanage Fund	54,030.88
Armenian Fund	46,789.19
Surgical Dressings Fund	36,030.67
Belgian Tobacco Fund	27,352.75
Facial Hospital Fund	22,116.55
Italian Fund	19,872.56
P. S. D. Fund	9,031.83
Artists' Fund	2,397.62

BOSTON AND NEW ENGLAND.

Board of Health, City of Worcester, Mass.—The annual report of the Worcester Board of Health gives the death rate of that city as 14.53 per 1000; excluding deaths at both state hospitals, it is 13.33; excluding non-residents, it is 12.34. This is the lowest death rate in half a century. The records of the city begin in 1864, when the rate was 30.68 and this was exceeded once, in 1872, when it was 31.41. As a cause of death, organic diseases of the heart have first place, followed by pneumonia, tuberculosis of the lungs, Bright's disease, apoplexy, and diarrhea and enteritis in children under two years. Of communicable diseases reported, there were 349 cases of tuberculosis, 342 of diphtheria, 144 of scarlet fever, 134 of ophthalmia neonatorum and 124 of whooping cough.

Hospital Bequests.—The will of the late Anna Bolton Matthews of Boston, who died on May 30, was filed in the Suffolk Registry of Probate on June 8. It contains many charitable bequests, among which a considerable piece of property is given to the Brookline Free Hospital for Women for the ultimate erection of a Cancer Hospital. The sum of $5000 is given to the Waltham Baby Hospital, and the residue of a $70,000 trust fund to the Industrial School for Crippled and Deformed Children and the New England Hospital for Women and Children. Specific bequests of real estate, of varying values, are made to the Boston Nursery for Blind Babies, the Children's Convalescent Home at Wellesley, the Children's Hospital, Boston, the Boston Floating Hospital, the Baldwinsville Cottage Hospital and the Vincent Memorial Hospital.

Massachusetts Medical Society.

ANNUAL MEETING OF THE COUNCIL.

JUNE 6, 1916.

THE annual meeting of the Council was held in the foyer of the Copley-Plaza Hotel, Boston, Tuesday, June 6, 1916, at twelve o'clock, noon. The President, Dr. Charles F. Withington, was in the chair and the following 120 Councilors were present:

BARNSTABLE.
E. E. Hawes, M.N.C.

BRISTOL NORTH.
W. H. Allen, V-P.
Sumner Coolidge.
R. D. Dean.
F. A. Hubbard, M.N.C.

BRISTOL SOUTH.
E. F. Cody.
E. F. Curry.
W. A. Dolan.
R. W. Jackson.

ESSEX NORTH.
F. B. Pierce, V-P.
R. V. Baketel.
I. J. Clarke.
E. H. Noyes.
J. J. O'Sullivan.
F. W. Snow, M.N.C.

ESSEX SOUTH.
C. H. Bangs.
R. E. Bicknell.
N. P. Breed.
P. P. Johnson.
Butler Metzger.

FRANKLIN.
G. P. Twitchell, M.N.C.

HAMPDEN.
J. M. Birnie, M.N.C.
T. S. Bacon.
E. L. Davis.
M. B. Hodskins.
E. A. Knowlton.
A. G. Rice.

HAMPSHIRE.
M. W. Pearson.

MIDDLESEX EAST.
E. C. Fish, M.N.C.
W. H. Keleher.
G. N. P. Mead.

MIDDLESEX NORTH.
J. V. Meigs, V-P.
E. J. Welch.
J. A. Gage, C.

MIDDLESEX SOUTH.
W. D. Swan, V-P.
M. H. Bailey.
H. T. Baldwin.
C. H. Cook.
H. F. Curtis.
E. A. Darling.
D. C. Dow.
A. W. Dudley.
G. W. Gay.
C. M. Hutchinson.
A. A. Jackson.
G. A. Miles.
C. E. Mongan.
J. F. O'Brien.
Godfrey Ryder.

MIDDLESEX SOUTH (cont.)
Joseph Stanton.
E. H. Stevens, M.N.C.
J. O. Tilton.
Julia Tolman.
G. T. Tuttle.
C. T. Warner.
G. W. W. Whiting.

NORFOLK.
T. F. Greene, V-P.
J. W. Ball.
A. N. Broughton.
P. W. Carr.
H. C. Ernst, C.
M. H. A. Evans, Tr.
C. B. Faunce.
R. W. Hastings.
G. W. Kaan.
Bradford Kent.
W. A. Lane.
Harry Linenthal.
T. J. Murphy, M.N.C.
A. P. Perry.
J. W. Pratt.
Victor Safford.
T. M. Shea.

NORFOLK SOUTH.
C. S. Adams.
J. C. Fraser, M.N.C.
E. N. Mayberry.

PLYMOUTH.
A. A. MacKeen.
Gilman Osgood.
F. J. Ripley.
F. G. Wheatley.

SUFFOLK.
E. S. Boland.
G. W. W. Brewster, M.N.C.
E. M. Buckingham, T.
W. L. Burrage, S.
David Cheever.
A. L. Chute.
E. A. Codman.
J. A. Cogan.
G. A. Craigin.
R. L. DeNormandie.
Albert Ehrenfried.
C. Frothingham, Jr.
C. M. Green, C.
W. C. Howe.
R. W. Lovett.
J. L. Morse.
Abner Post.
Anna G. Richardson.
W. H. Robey, Jr.
G. G. Sears.
G. C. Smith.
Richard M. Smith.
H. F. Vickery.
D. H. Walker.
C. F. Withington, P.

WORCESTER.
G. O. Ward, V-P.
F. H. Baker.
W. P. Bowers.
J. T. Duggan.
Homer Gage.
David Harrower, M.N.C.
A. G. Hurd.
W. L. Johnson.
F. H. Washburn.

WORCESTER (continued.)
C. D. Wheeler.
S. B. Woodward.

WORCESTER NORTH.
A. A. Wheeler, V-P.
E. L. Fiske.
A. P. Mason, M.N.C.
E. A. Sawyer.

The reading of the records of the last meeting was dispensed with. The names of the Nominating Committee were read by districts and the Committee retired. In the absence of the chairman of the Committee on Publications and Scientific Papers, the Secretary read, by request, an announcement that the Shattuck Lecturer in 1917 will be Dr. Richard P. Strong, of Boston. Dr. Charles M. Green presented the report of the Committee on Membership and Finance, and it was accepted by vote. The report is as follows:

Gentlemen:

THE COMMITTEE ON MEMBERSHIP AND FINANCE makes the following recommendations as to membership:

1. That the following-named Fellows be allowed to retire, under the provisions of Chapter I, Section 5, of the by-laws:

Cushing, Ernest Watson, of Boston.
Durgin, Samuel Holmes, of Duxbury.
Gardner, Clarence Rhodolphus, of Northampton.
Lane, Albert Clarence, of Woburn, with remission of dues to the amount of $15.
McClean, George Chesley, of Springfield.
Woodbury, Louis Augustus, of Groveland.

2. That the following-named Fellows be allowed to resign, under the provisions of Chapter I, Section 7, of the by-laws:

Ellis, William Raymond, of Brookline.
Haddock, Charles Whitney, of Beverly.
Jenness, Burt Franklin, U. S. Navy (Retired), of 3418 Fort Boulevard, El Paso, Texas, with remission of dues to the amount of $19.
Couch-Mora, Mary, of Porto Rico.
Murphy, John Patrick Henry, of Washington, District of Columbia.
Taylor, Jubal George, of Los Angeles, California, with remission of dues to the amount of $5.
Thorpe, Burton Durrell, of Newport, New Hampshire.

3. That the following-named Fellows be allowed to change their district membership, without change of legal residence, under the provisions of Chapter III, Section 3, of the by-laws.

Atwood, Blanche Louise, from Plymouth to Norfolk.
Mansfield, James Albert, from Middlesex South to Norfolk.
Pavlo, Samuel George, from Middlesex South to Suffolk.

CHARLES M. GREEN, *Chairman*,
ALGERNON COOLIDGE, JR.,
SAMUEL CROWELL,
FREDERIC W. TAYLOR,
ALFRED WORCESTER.

The Secretary read the reports of the committees appointed at the last meeting to consider the petitions of E. H. Ferguson, Joseph Shohan and G. W. Ellison for restoration to the privileges of fellowship, and the Council acted favorably on all, considering each petition separately.

The petitions of the following for restoration were read and committees appointed to consider them respectively:

For J. D. Taylor { T. F. Leen, W. B. Robbins, H. F. Vickery
For E. J. McCarthy { C. E. Prior, F. W. Plummer, W. H. McBain
For C. A. Oak { C. H. Bangs, N. P. Breed, Butler Metzger

The report of the Committee on Ethics and Discipline was read by Dr. J. A. Gage, and was accepted and approved unanimously. (See Appendix A for this report.)

Dr. H. C. Ernst read the report of the Committee on Medical Education and Medical Diplomas as follows:

Mr. President and Gentlemen:

On behalf of the COMMITTEE ON MEDICAL EDUCATION AND MEDICAL DIPLOMAS, I beg to present the following record:

Breaking the usual custom, this Committee had no representative at the Conference of the Council on Medical Education of the American Medical Association and has therefore no report to make.

Exercising its authority to rule upon diplomas from schools not on the accepted list and presented by candidates for Fellowship in the Massachusetts Medical Society, one case was disposed of as is indicated by the following vote, taken on May 1, 1916:

"To recognize the degree of Dr. John R. McPeake of Mattapan, for the purposes of his examination by the Censors for Fellowship in the Massachusetts Medical Society. The action of the Committee was based upon information received in letters written by Fellows of the Society endorsing Dr. McPeake's professional and personal qualifications."

The Committee presents a revision of the list of approved medical schools and colleges of the United States and Canada. This revision was carefully worked out by Dr. Newhall of the Committee, in accordance with the new list of the American Medical Association and, if adopted, will lead to a number of changes.

Respectfully submitted,

HAROLD C. ERNST, *Chairman*,
C. F. PAINTER,
H. W. NEWHALL,
J. F. BURNHAM,
C. FROTHINGHAM, JR.

Voted: To accept the report.

The revised list of medical colleges, diplomas from which are accepted from applicants for fellowship, that had been submitted by the committee just named, was approved by vote. A motion to reconsider this vote was lost by a voice vote. The revised list is a part of this record.

Dr. W. H. Robey, Jr., read the report of the Committee on State and National Legislation and it was accepted. The report follows:

The COMMITTEE ON STATE AND NATIONAL LEGISLATION of the Massachusetts Medical Society has been actively interested in the following bills which have been brought before the Legislature during the winter:

Bill 1093 provided for the licensing of midwives but did not make provision for their education. It stated that a person might attend a woman in normal childbirth but should not use any instrument nor assist at the childbirth by any artificial, forcible or mechanical means except in an emergency. It gave untrained and ignorant persons rights which would increase puerperal infection and other damage to mother and child. The bill was rejected in the House.

Bill 1088 permitting unvaccinated children to attend school was rejected in the House after a hard fight.

Bill 1090 on the administration of herbal remedies would have made it lawful for a certain "herb doctor" to practise without license, without knowledge of diagnosis, and without the control of the State Board of Registration in Medicine and would have opened the way for many charlatans. The bill had a considerable number of active proponents, but was finally defeated in the House.

Bill 1164 provided for a return to an unpaid State Board of Insanity and was favored by your Committee and by many of our alienists. The bill has just been signed by the Governor. It differs from the original bill in only one particular, which is, that the chairman, with salary, shall be selected by the Governor instead of by the Board.

Bill 702 authorizes counties to build tuberculosis hospitals to provide for the care of cases of the smaller towns and has been signed by the Governor. On the other hand, the bill which favored the removal of incorrigible tubercular patients to certain institutions was defeated.

Bill 1861 provided for the establishment of an Administrative Bureau of Registration comprising the Boards of Medicine, Dentistry, Optometry, Embalming, Pharmacy, Nurses and Veterinary Medicine. It was opposed by our Committee and was referred to the next General Court.

Bill 253 providing for research by the State Department of Health relative to the prevention of syphilis and authorizing the Department to spend, for the purchase of salvarsan and its derivatives, the sum of ten thousand dollars, has been passed.

The recommendations of the Board of Registration in Medicine providing for a report to the Board, by clerks of courts, of certain persons convicted in the courts where said clerks are employed, and that certain applicants not examined should be reimbursed, were both adopted.

Bill 1080 for the registration of nurses was defeated.

All of the bills for milk legislation finally centered in the McLaughlin Bill which was defeated, after a great amount of hard work. The legislation with reference to the Industrial Accident Board is given in a special report by Dr. F. J. Cotton.

The Committee wishes to thank all those who have given the time to help in these important matters, and especially the medical members of the Legislature.

CHARLES F. WITHINGTON, *Chairman*,
GEORGE W. GAY,
WALTER P. BOWERS,
FRANK G. WHEATLEY,
WILLIAM H. ROBEY, JR., *Secretary*.

Dr. Annie L. Hamilton read this report of the Committee on Public Health, and it was accepted:

Report of the COMMITTEE ON PUBLIC HEALTH.

Immediately after the Annual Meeting last year a meeting of this Committee was held and plans were started for a vigorous campaign to promote public health instruction throughout the Commonwealth.

The Secretary was asked to write to the Secretary of each District Society, asking for the names of members competent to give addresses on the various topics of public health, sanitation or hygiene, including preventive medicine. It was not at all expected that these lists should be more than a help in selecting those who might later be asked to coöperate. Several of the secretaries seemed to understand this,

while others felt that too much was being required of them.

Feeling that before we tried to find audiences we should know what we could offer, a number of our leading speakers were either personally interviewed or written to, and in almost every case the person was willing to speak if called upon.

It was part of our policy to work absolutely in accord with the State Board of Health and the Boston Board of Health.

The best method of reaching the public is by exhibits, lectures, lantern slides, which include maps, diagrams, and statistical tables for comparison as to the birth rates, death rates, infant mortality, prevalence and decline of communicable and other diseases dangerous to public and individual health. The full time public health officer, especially trained for this work, is the one best fitted to carry it on. One who must compete with the local physicians cannot properly do it. These are the methods of the boards of health. Their plans were also at a formative period last summer, as the two staffs had been but recently appointed.

It soon became evident to your Committee that we had thought out a plan almost exactly like theirs, and were actually interviewing many of the same men and asking their coöperation with us. While the spirit with which we were met was a most generous one of willing helpfulness, we saw that we could only try to do in a small way what they were trying to do in a large way, with much more time and much more ready money and equipment at their disposal. We would simply cover part of the same ground less effectively.

Our work has been rather limited for these reasons.

It was thought that by reaching the Fraternal Insurance Companies and there giving plain talks on health, much might be accomplished. Accordingly, letters were written to several of the largest and most influential companies, but the idea was not taken up enthusiastically by them. It seemed they were already receiving as much instruction upon such subjects as they felt the need for.

We have continued our affiliation with the Massachusetts Federation of Churches and the two Committees have met and talked over various methods of advancing public health work.

Dr. Abby Noyes Little, who has carried on the work of the Sub-Committee on Women's and Children's Welfare, has resigned, as she is now doing good work in a little settlement in Kentucky where there is no other doctor within fifteen miles.

Respectfully submitted,

MILTON J. ROSENAU, *Chairman*,
W. IRVING CLARK, JR.,
ENOS H. BIGELOW,
ROGER I. LEE,
ANNIE LEE HAMILTON, *Secretary*.

Dr. F. J. Cotton reported for the Committee on the Workmen's Compensation Act. He said:

"Your Committee was appointed in 1913 to consider the working of the Workmen's Compensation Act in relation to the medical profession. In the past we have reported that the workings of the Act, under the so-called gentlemen's agreement with the insurance companies, under the administration of the Industrial Accident Board, was fairly satisfactory. This seems no longer to be true—the spirit of the verbal agreement is not being lived up to fully, and it seems to us that the time has come for some action by the Society looking to the assertion of the rights and privileges of the profession. Since there is at present great interest, and even excitement, over the situation, it seems to us unwise to do more than to present this situation and such plans of action as have been suggested, thus throwing the matter open for discussion and constructive action by the Society. With this purpose in view, we ask for the acceptance of this report."

F. J. COTTON, *Chairman*,
W. A. DOLAN,
S. B. WOODWARD,
F. W. SNOW,
R. J. MEIGS.

Voted: To accept the report and discharge the Committee. On motion by Dr. A. N. Broughton, seconded by Dr. F. B. Pierce, it was *Voted:* That a committee of five be appointed by the chair to continue the work of the committee just discharged, and the chair appointed as such a committee, A. N. Broughton, W. A. Dolan, F. W. Snow, R. J. Meigs, E. A. Knowlton.

Dr. Homer Gage presented a report for the Committee appointed to consider Hospital Efficiency. (See Appendix B for this report.) *Voted* to accept the report. On motion by Dr. Gage, it was voted, according to the provisions of Chapter III, Section 4, of the by-laws, to establish a Section of Hospital Administration to meet at the annual meetings of the Society.

The Librarian read this report and it was accepted:

REPORT OF THE LIBRARIAN.

The Librarian reports that during the past year he has attended to the various duties of his office, reporting to the BOSTON MEDICAL AND SURGICAL JOURNAL payments of annual dues, changes of addresses, etc., in order that the Fellows may receive the JOURNAL promptly.

A second issue of the Annual Directory of the Officers and Fellows was compiled and issued as a supplement to the JOURNAL. It is desired most earnestly that the Fellows and the District Secretaries will report at once any changes of addresses, that the next edition may be as accurate as possible.

Respectfully submitted,

EDWIN H. BRIGHAM, *Librarian*.

Dr. Cook introduced and explained this amendment to Section 1, Chapter IV, of the By-Laws, and it was moved and seconded that it be adopted:

Chapter IV, Section 1.

In the second line, after the word "president," insert the word "ex-presidents," and in the third line omit the word "and," and after the word "treasurer" insert the words "and librarian," so that the section shall read as follows:

"Section 1. The council shall consist of councilors chosen by the district societies, and the president, ex-presidents, vice-president, vice-presidents *ex officiis*, secretary, treasurer and librarian of the general society, and the chairman of each standing committee.

Voted: To approve the amendment.

The chair spoke of the action of the Legislature in appointing a Recess Committee to study the subject of Industrial Health Insurance, of the bills that have been introduced into the Legislatures of Massachusetts, New York and other states, and of the need of safeguarding the interests of the medical profession, and he asked for authority to appoint a committee to consider this subject.

Voted: That the Chairman appoint a committee of three on Industrial Health Insurance. In accordance with this vote he appointed F. J. Cotton, W. H. Merrill, F. W. Anthony.

On motion by Dr. Dolan, it was *Voted:* That the Committee on Industrial Health Insurance use their best efforts to prevent the taking away from the practitioners of the State the privilege of the attending their own private cases.

The Nominating Committee having returned, presented this list of nominees, and on proceeding to ballot, the tellers reported that 102 ballots had been cast, all for the list as presented, and the President declared them elected:

President, Samuel B. Woodward, Worcester; Vice-President, Frederic W. Taylor, Cambridge; Secretary, Walter L. Burrage, Boston; Treasurer, Edwin M. Buckingham, Boston; Librarian, Edwin H. Brigham, Brookline; Orator, Philemon E. Truesdale, Fall River.

The President nominated and the Council appointed the following standing committees for the ensuing year:

Of Arrangements.—E. L. Young, Jr., J. H. Young, J. L. Huntington, R. H. Miller, C. H. Lawrence, Jr., Donald Macomber.

On Publications and Scientific Papers.—G. B. Shattuck, E. W. Taylor, R. B. Osgood, F. T. Lord, R. M. Green.

On Membership and Finance.—C. M. Green, Algernon Coolidge, Jr., Samuel Crowell, F. W. Taylor, Alfred Worcester.

On Ethics and Discipline.—J. A. Gage, J. W. Bartol, Henry Jackson, T. J. Robinson, David Cheever.

On Medical Education and Medical Diplomas.—H. C. Ernst, C. F. Painter, H. W. Newhall, J. F. Burnham, Channing Frothingham, Jr.

On State and National Legislation.—S. B. Woodward, F. G. Wheatley, W. P. Bowers, W. H. Robey, Jr., J. S. Stone.

On Public Health.—M. J. Rosenau, W. I. Clark, Jr., Annie L. Hamilton, E. H. Bigelow, R. I. Lee.

Adjourned at 1.35 P.M.

WALTER L. BURRAGE, *Secretary.*

APPENDIX A.

REPORT OF THE COMMITTEE ON ETHICS AND DISCIPLINE. 1915—1916.

The work of this Committee has largely increased in recent years. During the 42 years that the Committee on Ethics and Discipline has existed, 53 meetings have been held. Of these, 36 occurred during the first 39 years, an average of less than one each year; while during the last three years 17 meetings have been held. Coincidently, there has been an increase in the number of cases affecting the welfare of our Society that have been referred to the Committee, and complaints have been received not only from members, but from various State boards and even from the laity. This increase of work has not only demanded more of the members' time, but has presented many new and difficult problems for solution, and has been made possible only by the efficient coöperation of our Secretary.

In reviewing the work of the Committee since its inception, we find that it has dealt with cases of advertising and endorsing patent medicines, false representations as to qualifications for admission, consultations with irregular practitioners, joining other medical societies, immoral personal conduct, doing of abortions, and failure to obey the State health laws.

The question of what constitutes improper advertising has been one that has called for the serious consideration and discussion of the Committee. Today there is a vast amount of advertising by members of this Society, not only covering the whole field of the sanatoria, but specifying specialties and methods of practice; while the forms of indirect and illustrated advertising are legion.

Whether the Society should establish a guiding principle and policy in regard to this matter is open to debate, but it seems irrefutable that what is tolerated in one case should not be condemned in another.

During the last two years your Committee has had to consider a number of complaints against members for advertising their practice in the public press, and has held that such practice, if persisted in, might well constitute cause for resignation from the Society.

Charges that a member of this Society advised and offered to assist in procuring an abortion were tabled because witnesses would not testify before the Committee.

Charges preferred by the State Board of Registration in Medicine against a Fellow for aiding an irregular practitioner to practise medicine were referred to the President for discipline. His letter follows:

October 23, 1915.

W. L. Quennell, M.D.,

Dear Sir:—Our Committee on Ethics and Discipline has reported to me that, having received charges against you of assisting an illegal practitioner of medicine to evade the law, and having notified you of the same, you did not appear before them but sent them a letter in which you acknowedged the truth of the charges and therewith transmitted your resignation from the Society. I beg to say that if this resignation, which now comes before the Committee on Membership, shall be accepted, that acceptance alone will save you from the severe public censure which would deservedly follow an act so contrary to the spirit of the law, dangerous to the public health and violative of professional ethics.

Yours truly,

CHARLES F. WITHINGTON, *President.*

In a second case of like character the evidence seemed to exonerate the doctor from wrong intentions and upon his disavowal of intentional misconduct and assurances of future care, it was reported to the President and placed on file.

But one case charging neglect in ophthalmia neonatorum has been presented since our last report, apparently indicating that the previous action taken by your Committee has stimulated more prompt and careful handling of these cases.

Charges were preferred against a Fellow by a patient, accompanied by a request that he be allowed to have a public hearing where he might present witnesses under oath, and also by a petition to the same effect signed by 25 fellow citizens. After investigation, the Committee found no evidence of dishonorable conduct, and found no probable cause to institute trial. In denying the petition for a hearing the Committee emphasized the fact that its function is that of a grand jury and not that of a board of trial before which cases are to be tried.

Early in February, 1915, the attention of the Committee was called to certain public utterances appearing in the press reflecting upon the medical profession, and formal complaints were received from individuals, and a District Medical Society. At a later meeting in February, 1915, the subject was fully considered, and it was voted that the Secretary should write to Dr. Richard C. Cabot, asking whether he made the remarks ascribed to him, and whether on other occasions he had publicly made similar statements reflecting on the ethical standards of the medical profession. His reply was published in the BOSTON MEDICAL AND SURGICAL JOURNAL of Feb. 18, 1915. (See letter to Boston *Herald.*)

On Dec. 7, 1915, the Committee on Ethics and Discipline voted that a letter be sent to Dr. Richard C.

Cabot, asking him if his remarks at the Evans Memorial, Nov. 16, 1915, were correctly reported, and asking for his position in the matter. The letter is as follows:

December 10, 1915.

Dr. Richard C. Cabot,
1 Marlborough Street, Boston,

Dear Doctor Cabot:—

On Tuesday, December 7, the Committee on Ethics and Discipline of the Massachusetts Medical Society was called upon to consider certain complaints which had been made by different individuals and which were based upon recent press reports purporting to represent correctly your views of some aspects of medical practice. The meeting of the Committee was held immediately following a conference called by the President to consider these complaints, at which were present the President and three ex-presidents of the Society, together with the full membership of the Committee on Ethics and Discipline. At this conference it was brought out that a recent address of yours, as reported in the newspapers, had elicited numerous unfavorable opinions not only from the profession, but also from the laity, and it was further indicated that there is a prevailing impression that comments reflecting seriously upon the honor and intelligence of your fellow practitioners are allowed by you to circulate freely without due regard for the possible harm which may ensue from their publication.

The Committee has at hand clippings from various newspapers of or about the date of November 17, which contain accounts substantially agreeing in detail, of an address delivered by you at the Evans Memorial, November 16, 1915; but with respect to the accuracy of these accounts the Committee has no information whatever.

Knowing that physicians are often misquoted in the papers, and with a desire to clear up certain points of doubt in regard to your real attitude, the Committee would be glad to hear from you either by letter or in conference at a time of mutual convenience.

Respectfully yours,

WALTER L. BURRAGE,
Secretary of the Committee, under the By-Laws of the Society.

In reply the following was received:

Boston, December 10, 1915.

Dear Dr. Burrage:—

I enclose a copy of a letter which I sent to the Boston *Herald* the day after its very false and misleading report of my address appeared. I have not seen any of the reports of the other papers, but if they are as false as the *Herald*, they no doubt will have given just offense to physicians.

I wish you would ask Dr. F. B. Percy of Brookline, or Dr. F. L. Richardson of the Evans Memorial, both of whom were present, whether anything that I said seemed to them of the character which has been complained of.

Yours sincerely,

RICHARD C. CABOT.

The letter to the Boston *Herald* reads as follows:

(Published Feb. 18, 1915, in the BOSTON MEDICAL AND SURGICAL JOURNAL but not in the Boston *Herald*.)

To the Editor of the *Herald:*

I wish to protest against the headlines set over the very inaccurate account of my talk at Evans Memorial last evening. The mistakes in the body of the account are not, most of them, very vital, but to represent me as saying that "nine-tenths of doctors guess," is in the first place false, as I never said it, and in the second place meaningless. If it means that nine-tenths of doctors sometimes guess, it must be true of ten-tenths. If it means that nine-tenths of them habitually guess or guess nine-tenths of the time, as many would suppose on reading the headline, it is in my belief entirely untrue, and very unjust to the body of the medical profession.

I am not trying to contrast hospital physicians with other physicians, but to contrast the treatment which any physician can give when he has the advantages of hospital laboratories and instruments of precision, with the treatment which that same physician or any other could give without these aids. It is a difference not of personalities but of methods, and I protest against reports which make it appear falsely, that I think ill of the efforts and fidelity of most physicians.

(Signed) RICHARD C. CABOT, M.D.

At a meeting of the Committee on December 21, 1915, the following letter was approved, and it was unanimously voted to send the same to Dr. Cabot, as expressing the Committee's attitude:

Boston, December 21, 1915.

Richard C. Cabot, M.D.,
Boston, Mass.,

Dear Dr. Cabot:—

Twice within the last year the Committee on Ethics and Discipline have received complaints from the members of the Massachusetts Medical Society in regard to your public utterances as spread over the country through the press. After mature deliberation and correspondence with you in regard to the matter, we feel that the complaints are justified.

The statements, as printed, lead the public to believe that the motives and practices of the majority of your fellow practitioners are unworthy,—a belief that you yourself must admit to be incorrect,—and a disclaimer in the medical press does not correct the wrong impression obtained by the public. Therefore, such a course tends to do an injustice to those who, like yourself, are constantly striving to improve the public health, and does not meet with our approval.

We believe that any member of the profession desiring to improve existing conditions of practice, or to introduce entirely new methods of practice, should first present his views before the members of the profession,where his claims, if approved, can receive the endorsement of the Medical Society, or, if false, can be challenged and corrected. By such a method, authoritative statements can be made that will enlist the approval and coöperation of the public, and enhance both the influence of the medical profession and the confidence of the community. We feel that to present the public with information less well digested redounds to the injury of both parties.

Finally we wish to call your attention to the unselfish efforts of the profession at all times to instruct the public in regard to their health, and the oft-expressed opinion that we should carefully forego any statements that are likely to mislead the public.

Signed by all the members of the Committee on Ethics and Discipline.

A letter to Dr. Cabot in January, asking for a reply to the Committee's letter brought the following:

January, 25, 1916.

Dear Dr. Gage:—

I had not expected that your Committee desired an answer from me. I should have supposed that the time for you to hear what I have to say was before you condemned me—not after!

But if you desire an answer you must tell me what it is that you charge me with. You have never yet made that clear. The document which you enclose refers to "a course" which you condemn. (Par. second.) *But you nowhere describe that course.*

1. Did you disapprove of my course in saying what I *did say*?

But that you don't know, and, I believe, have made no genuine effort to find out. You cannot, therefore, disapprove it.

2. Did you disapprove of what the newspapers printed?

So did I, but you know that I didn't say it. You cannot, therefore, disapprove it.

3. Did you disapprove of my not contradicting the newspaper report?

But I did all I could, or anyone could, to contradict it, and was refused publication in the daily press. I then contradicted the statement in the Boston Medical and Surgical Journal.

You cannot disapprove this? What more could I do?

4. Did you disapprove my trying to introduce "entirely new methods of practice"?

But I referred to nothing not at least eight years in existence, and repeatedly described by me and others before medical audiences before it was heard by the laity.

Hence you can't disapprove of me here!

Whenever you will plainly state what you disapprove of, I will answer you fully, and will convince you that you have treated me with the grossest injustice. Luckily, you cannot hurt me in the least.

Yours cordially,

Richard C. Cabot.

At a meeting of the Committee, February 2, it was voted to send the following letter to Dr. Cabot:

Dear Dr. Cabot:—

In reply to your letter of January 25, 1916, we wish to add the following: We have consulted the doctors to whom you referred us in your original letter and we have taken other measures to make ourselves acquainted with the import of your remarks and the impression they made upon the audience. Furthermore, we have in print the impressions you conveyed to the representatives of several of the Boston newspapers who reported your lecture, consequently we feel that we were amply justified in our conclusions, and we consider that more than one such talk constitutes "a course of action."

Your assumption that we intended to do you an injustice or to hurt you in the least is due, we think, to a misapprehension. What we intended to convey to you was the idea that a great many of your fellow practitioners felt that you had been unfair to them in your public utterances—which, if true, constitutes an injustice—and we hoped that a realization of this fact would lead you to confine your public utterances to statements well within the facts. In closing, we wish to state finally that our former letter expresses fully the convictions of the Committee, and we also wish to inform you that we feel it our duty to present these letters as a report on our action to the President and Council, to whom we are responsible. Whether you wish your correspondence to be included in the report we will leave to your decision.

Yours very truly,

J. A. Gage, *Chairman.*

The foregoing comprises the correspondence upon this subject and concludes this report of the Committee on Ethics and Discipline.

J. Arthur Gage, *Chairman,*
J. W. Bartol,
Henry Jackson,
G. de N. Hough,
S. B. Woodward.

APPENDIX B.

Report of the Committee on Hospital Efficiency.

At the last Annual Meeting of the Council, the Committee on Hospital Efficiency recommended the appointment of a Committee, to consist of representatives of the medical, surgical and administrative departments of the hospitals of the State, further to consider the means of increasing their medical and surgical efficiency, and to prepare a plan for a uniform hospital report, which, upon the approval of the Council, should be recommended to the favorable consideration of the hospitals of Massachusetts.

This recommendation was adopted, and a Committee appointed, which begs leave to submit the following report:

It seemed best to concentrate our efforts this year upon the subject of medical and surgical statistics as presented in the annual hospital reports. The tendency for some years past has been to present these statistics in greater and greater detail of division and subdivision, until they have come to occupy a very large part of the report, to require much labor and time in their preparation, and to add very considerably to the cost of printing. All of this without any corresponding increase in their value to the profession or to the public.

We have felt that it was possible to have some system by which all necessary information could be given more simply, more economically, and just as clearly as it is done now, and your Committee submits herewith a tentative plan for this purpose. We realize that it is far from perfect, and shall welcome any criticism or suggestion that may be offered.

The plan is founded upon the report made to the Clinical Congress of Surgeons at its Boston meeting, by a committee of which Dr. E. A. Codman of Boston was chairman, although it differs much in some important details.

Each department of the hospital, such as the medical, surgical, and the different specialties may present the statistics of cases treated, in a table which need occupy, at most, not more than a single printed page, —usually much less.

Transversely, the table may be divided according to an anatomical, vertically, according to a pathological classification, as illustrated in the accompanying specimen, which shows the actual surgical work of a hospital treating 3000 in-patients a year.

It will be seen that the classification adopted in this specimen is quite different from that recommended to the Clinical Congress of Surgeons,—it is modelled more nearly after that in use at the Roosevelt Hospital in New York.

Its method of preparation is as follows: Every patient, on admission, is given a number, and upon discharge the records are filed or bound in numerical order. The same number is entered upon a very much enlarged table similar to the one here shown, as the discharge card and record are received from the ward, *e. g.*, if the case were one of cholelithiasis, its number would be entered in the space opposite Liver, Bile Ducts and Pancreas, and under Foreign Bodies including Calculi; if a uterine fibroid, opposite Uterus and Ligaments, and Benign Growths, and so on.

At the end of the year, the number of all the uterine fibroids are under the Benign Growths of the Uterus, so that ready reference may be made, if wanted, to the detailed history records, and the total number can be ascertained at a glance, for publication in the hospital report.

A concise table of operations may or may not be added as desired, but there should always be added a brief summary of the diagnosis and important points in each fatal case treated in the hospital during the year, with pathological report in all cases in which an autopsy was obtained.

This would afford a clear, concise record of the amount and character of the work done by the hospital staff, with the data easily accessible for anyone desiring more detailed information.

If, in a few words, reference were made to the present condition of certain classes treated in the preceding years, *e.g.* the present condition of the cancers of the breast, or of the hernias, which have appeared in the earlier tables, it would seem as if such a report, without taking up as much printed space, would afford a much better idea of the hospital efficiency than can be gained from the old tables, from which all that we have is, that the patients were discharged cured, relieved, not relieved, not treated, dead.

Although all the details of adapting this plan,

SURGICAL DISEASES TREATED.

ANATOMICAL CLASSIFICATION. / PATHOLOGIC CLASSIFICATION.	New Growths—Malignant	New Growths—Benign	Inflammatory—Acute	Inflammatory—Chronic	Inflammatory—Tuberculosis	Inflammatory—Syphilis	Inflammatory—Special Infections	Malformations and Deformities—Cong.	Malformations and Deformities—Acquired	Traumatic—Fractures and Dislocations	Traumatic—Wounds and Gangrene	Traumatic—Hernia	Other Traumatic Conditions	Intoxications and Poisons	Foreign Bodies including Calculi	Diseases due to animal parasites	Conditions pertaining to Pregnancy	Varicosities (Hemorrhoids, Varicocele, etc.)	Other Conditions—Unclassified.	Totals
Mouth, Tongue, Teeth, Salivary Glands	2	3	4	2				5											2	13
Pharynx, Tonsils, Naso-Pharynx, Oesophagus	1	263	8	15				4					1							292
Stomach, Pylorus, Duodenum	1			3					1										1	6
Liver, Bile-passages, Pancreas			8	8		1									32				1	50
Appendix			66	63																129
Intestines except Duodenum, Rectum Anus, Peri-rectal Tissue	4		1	11	1				2			47	2			1		24	5	98
Peritoneum, Omentum, Retro-peritoneal Tissue	1		3	5	1										1				1	12
Blood, Arteries, Veins			1	2															2	5
Heart, Pericardium			2																	2
Lymphatic Glands and Vessels, Spleen	2	1	15	6	23															47
Brain, Meninges, Spinal Cord					1			2											1	4
Nerves, Diseases of Mind and Nervous Diseases of Unknown Origin													2	3					8	13
Nasal Cavity and Accessory Sinuses, Larynx, Trachea		1		1	2			1												5
Bronchi, Lungs, Pleurae	1		9	2																12
Kidneys, Ureters, Urinary Bladder	1	1	5	6	2				3					2	5					25
Female—Urethra, Vulva, Vagina, Pelvic Floor	4	3	1				2						57							67
Uterus and Ligaments	19	54	2	33				2	6				8				52			176
Tubes and Ovaries	5	18	23	25									1						1	73
Mammary Glands	23	10	10																1	44
Male—Penis, Prostate, Seminal Vesicles, Testes		1			1			23					1							26
Eye and Ear			35	36			1				2		1		1					76
Skin, Hair, Nails, Glands of Skin	2	3	5	4		2	1		4		5		8							34
Thyroid, Para-thyroid, Thymus, Suprarenal, Pituitary		5																		5
Bones, Cartilages, Joints	7	3	8	18	19	4		24	15	54	2		9	1					2	166
Connective Tissue, Muscles, Tendons, Bursae, Fat	1	7	14	6					6		7		22		3					66
General Systemic Infections			2	1	1	4													7	15

especially to the work of the medical department, have not yet been worked out, we believe that it is capable of being made a practical working basis for a uniform hospital report that shall be at once simple, economical and illuminating; and we recommend that further study be undertaken to see if it can be satisfactorily adapted to the large metropolitan, as well as to the small private community hospital.

Your Committee further suggests that the problems of hospital records, end results, and general hospital administration, are of such vital interest to the profession and to the public that their consideration might profitably occupy a more prominent part in the Society's proceedings.

We believe that a special section devoted to these subjects would attract wide attention and be productive of valuable results in increasing the efficiency of the hospitals of the State.

HOMER GAGE, *Chairman*,
P. P. JOHNSON,
P. E. TRUESDALE,
LINCOLN DAVIS.